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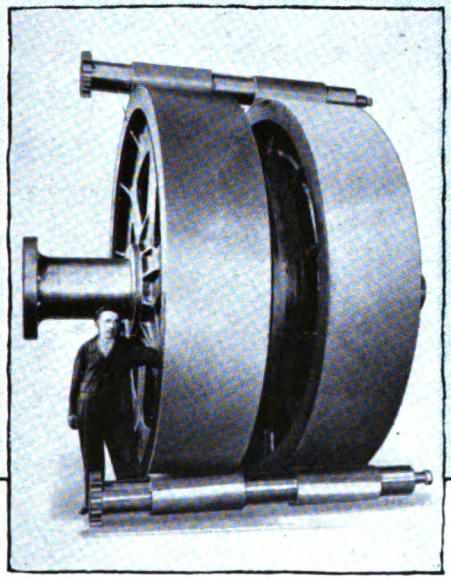

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Your Guide To this Issue

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NATIONAL policy depends for effectiveness on naval strategy. By neglecting to maintain equality in naval power under the disarmament treaty we have weakened as a world power.

See Page 11

Naval Architects

PROGRESS in any art originates in ideas. The Society of Naval Architects and Marine Engineers offers an appropriate forum for the exchange of ideas and the discussion of experience.

See Page 13

Trials, M. S. Tampa

SUCCESSFUL trials of the M. S. TAMPA with a double acting engine, the first vessel of the shipping board's diesel conversion program, marks a definite advance in overall efficiency.

See Page 15

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A SHIP'S form is obtained by cutting away portions of the block formed by its three dimensions. How little can be cut away for greatest economy as a cargo carrier?

See Page 25

Port Houston Grows

HOUSTON is growing as a port due not only to its geographical position as the logical outlet for a great rich territory but also to progressive development of port facilities.

See Page 26

A Great Inventor

BY AWARDING the subject of this sketch the highest honor of the engineering profession just recognition has been given a great inventor who has done much to increase safe navigation.

See Page 30

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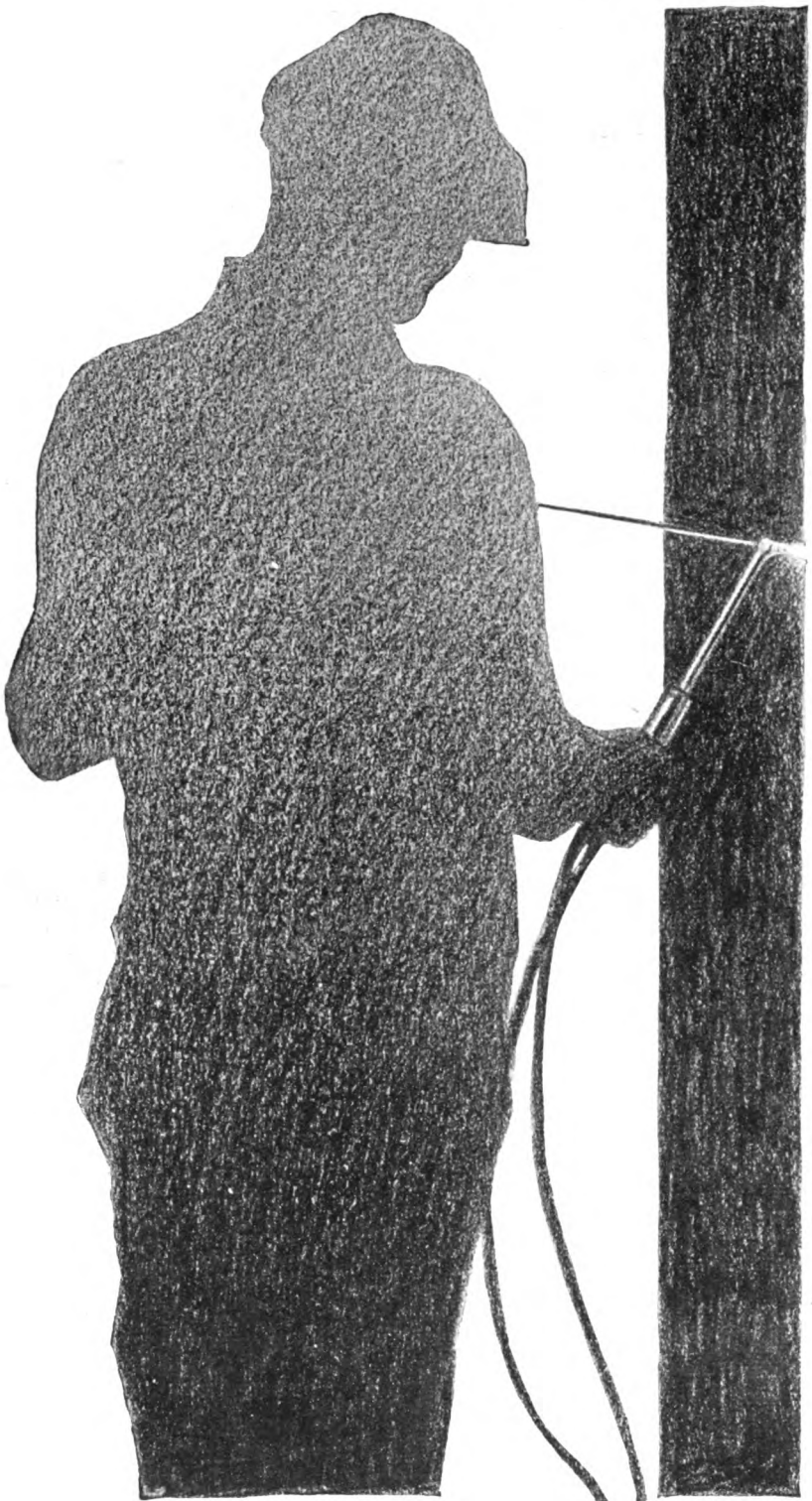

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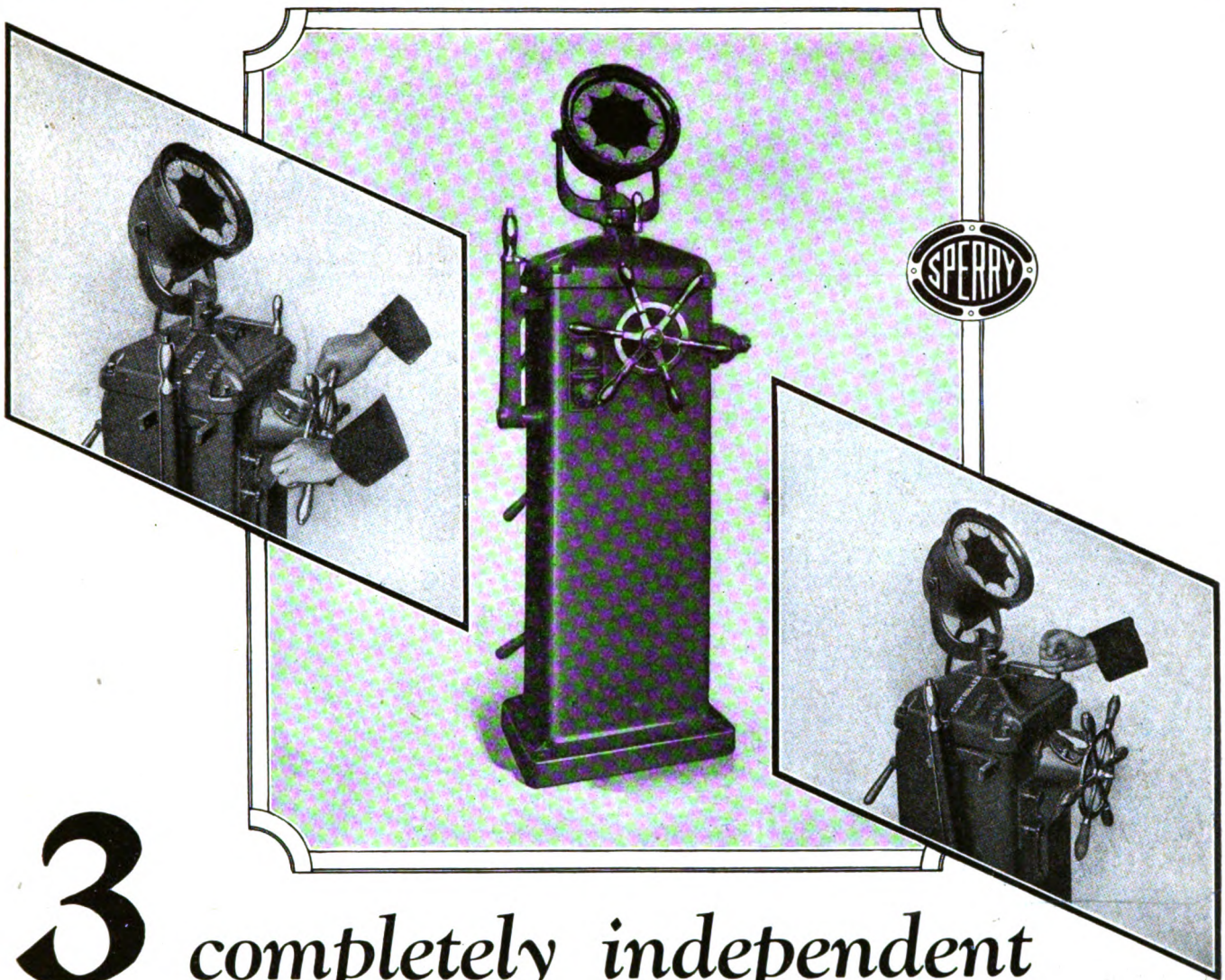

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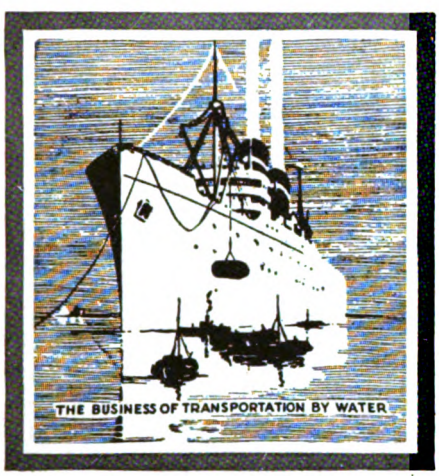
The National Publication Covering the Business of Transportation by Water

FOUNDED 1878



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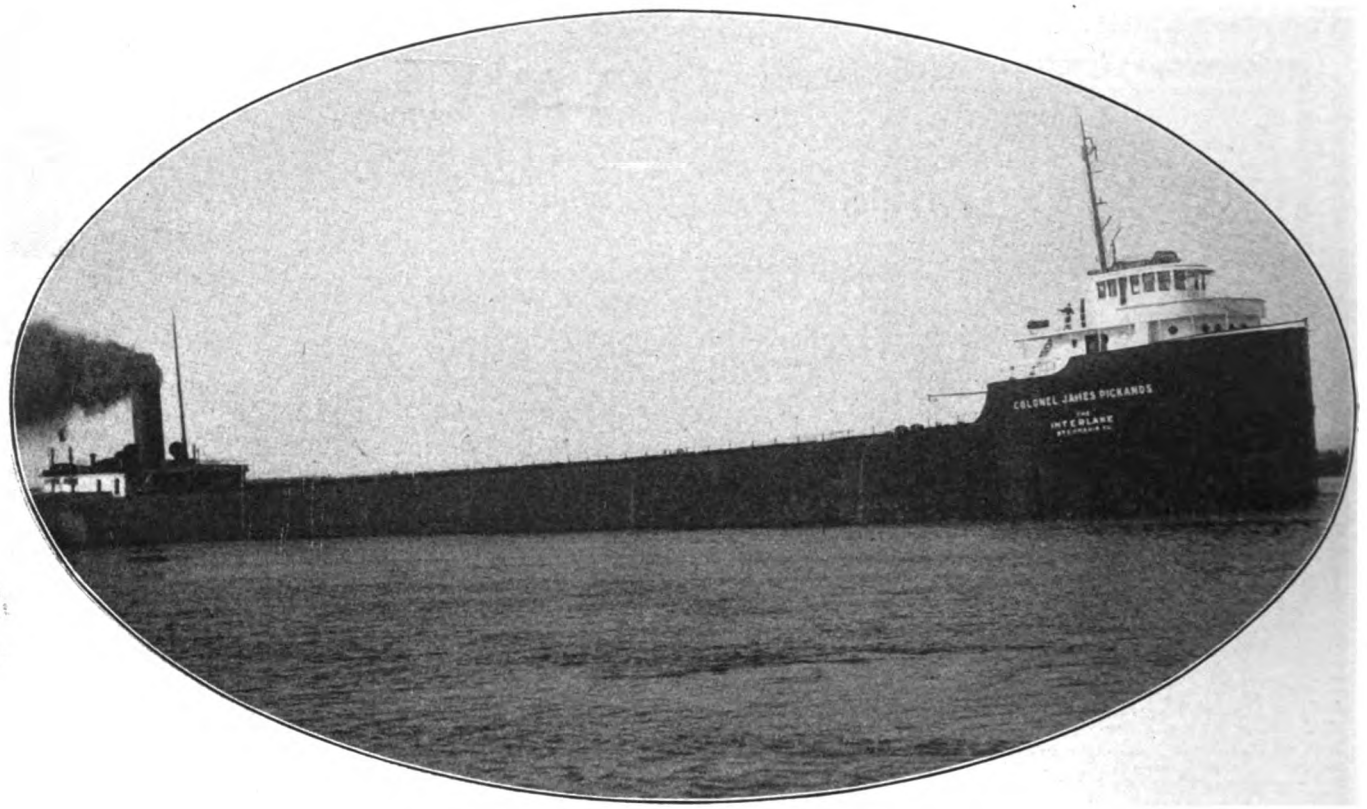

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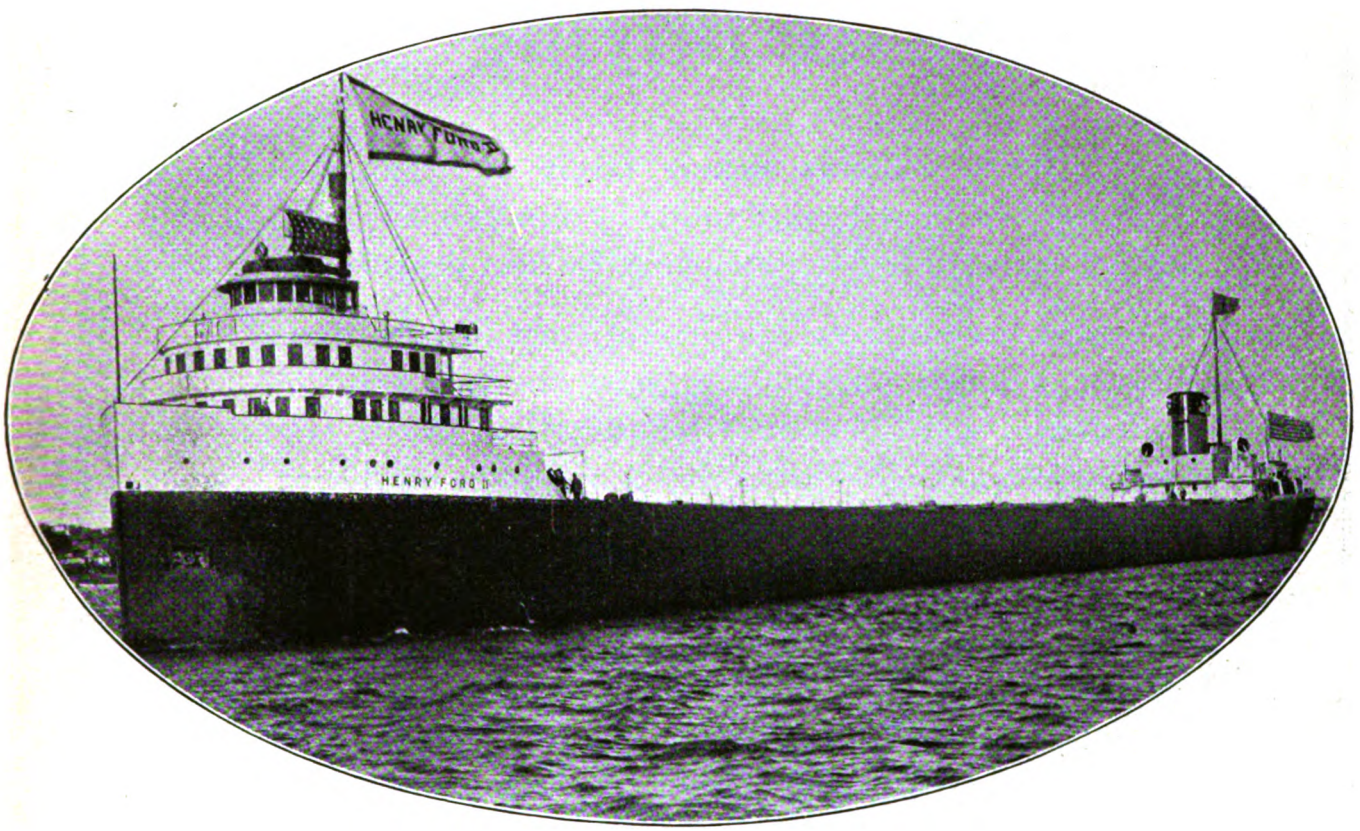

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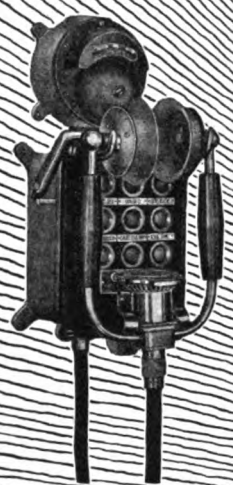

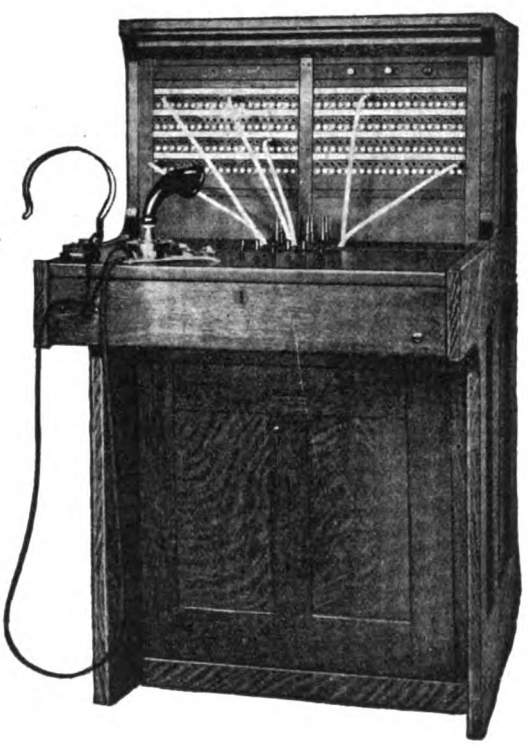

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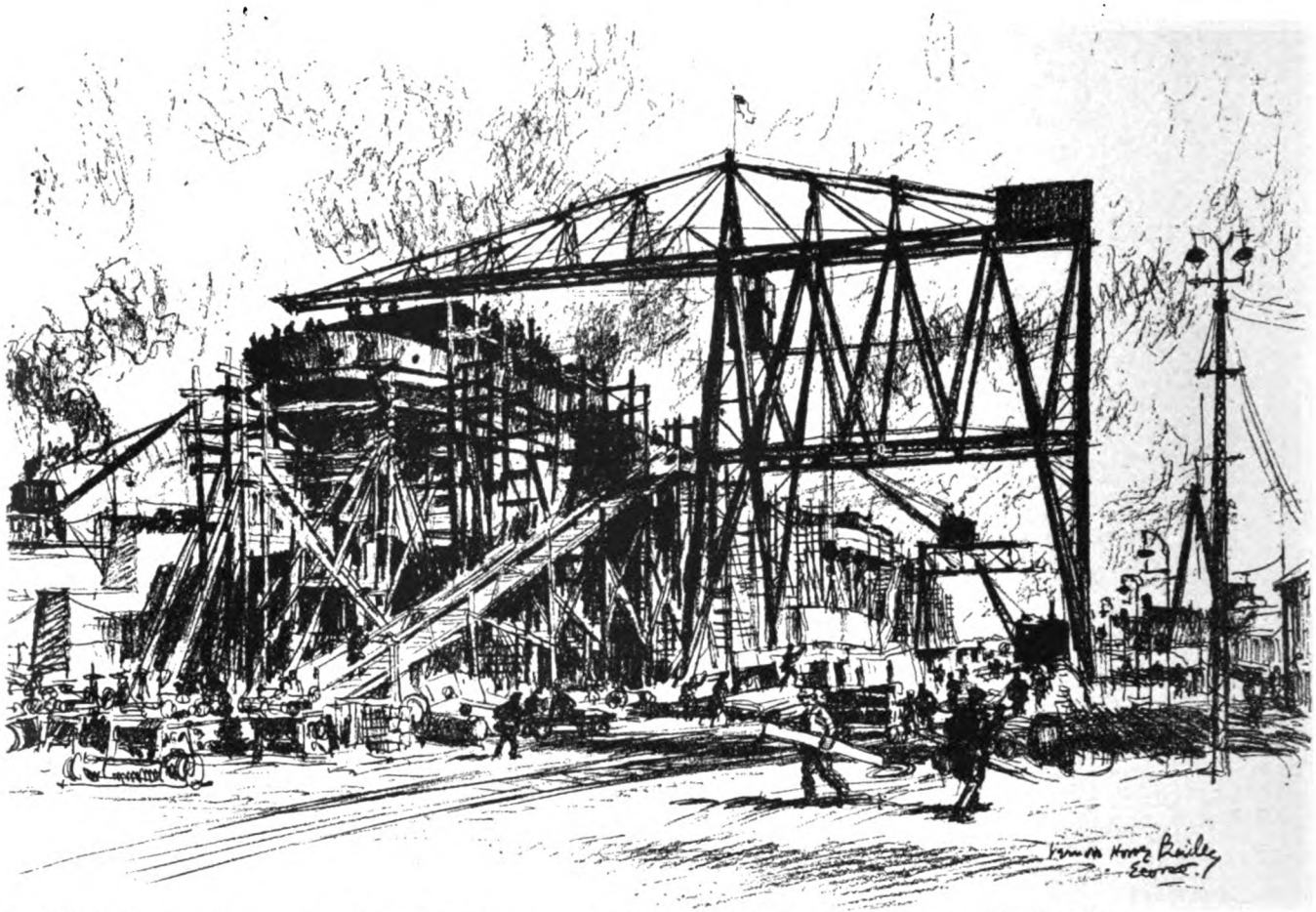

Great Lakes Hull under construction at River Rouge Yard. From an original etching by Vernon Howe Bailey. Hull construction

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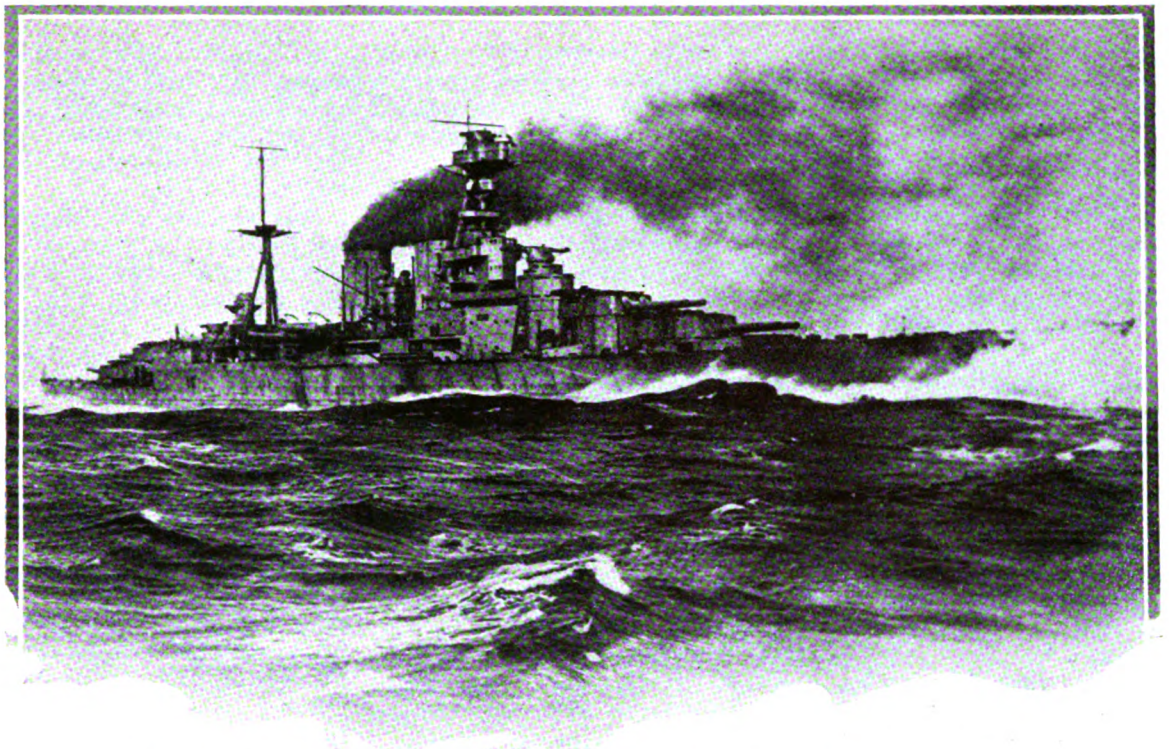

Battle cruiser H. M. S. Hood at full speed, during recent war maneuvers—Both powerful and fast

Naval Disarmament Is a Gamble

Our Naval Leadership Is Gone—Status Quo Has Not Been Maintained—Cruiser Equality Has Lapsed—Naval Strategy Determines National Policy

By Capt. A. W. Hinds, U. S. N.

I HAVE heard it said that a book written by an American naval officer was the cause of the World war. The title of the book is *The Influence of Sea-Power on History*, and its author was the late Rear Admiral A. T. Mahan, U. S. N.

The story runs that the German Kaiser read the book and was so impressed with Mahan's analysis of the effect of naval strength on national welfare that he had all officials, army, navy and civil read it. The book deals mainly with the history of England, France, Holland and Spain and shows in a clear, simple manner how closely allied national prosperity and sea-power were in the cases of these great powers. It shows conclusively how England built up in wealth and influence as her navy increased in comparative strength and how the influence of Spain, Holland and France declined as their power at sea weakened. It was mainly the influence of Mahan's books that brought about the decision of the Germans to build a strong navy—a decision the British could not accept.

Why We Need a Navy

DO WE realize how definitely a loss in naval power, as compared, of course, with the naval strength of other powers, means restriction of the national will and purpose insofar as all relations with foreign nations and distant dependencies are concerned? Captain Hinds, in a letter to the editor, made clear his purpose. He said in part: "It seems very difficult to get the American people to learn about their navy. If we can once get the people to know what the navy is for, and what it can do, then our responsibility ends. After that, it is only a question of our duty to keep what ships the nation gives us in efficient fighting condition."

There exists all over the world a pressure for reduction in naval armament. Among the other leading naval powers, the British Empire, Japan, France and Italy, the pressure is due to national poverty. In the United States the pressure is due partly to a wave of economy and partly to a national spirit of generosity. The United States is not a warlike nation and those of her citizens, who are pressing for general naval disarmament, undoubtedly feel that America will be safe even with her naval strength reduced to a very low limit. It is not believed for an instant that any American would work for disarmament if he thought he was thereby placing his country in a dangerous position.

The author, Captain Hinds, is chief of staff, battleship divisions of the United States fleet.

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As is generally known, the United States has taken part to date in two naval reduction conferences. The first was at Washington in 1922, when we engaged to scrap twice as much modern war-craft as the British Empire, and voluntarily gave up our position as the world's leading naval power to drop back to a position of equality with the British in battleships and air-craft carriers.

No agreement was reached as to submarines or cruisers or auxiliary war-craft at the Washington conference. Since that conference the British and Japanese have continued building submarines and cruisers until these three leading naval powers are nearly equal in submarine strength, and the ratio in cruiser strength is about as follows: British Empire 4, Japan 2, United States 1.

At the present time America has representatives in a preparatory conference on disarmament of some twenty nations meeting at Geneva. This body is to study disarmament and to try to decide whether a World disarmament conference promises any practical results. With the league of nations showing signs of breaking up the chances of a successful World disarmament conference in the near future seem poor, but it seems probable that, in case of failure of the general disarmament negotiations at Geneva, a purely naval disarmament conference will soon be proposed by one of the principal naval powers.

We Need a Farsighted Policy

One of the criticisms of American statesmanship in the past has been that it has not been sufficiently farsighted, and that those who have been responsible for steering the ship of state have not fully appreciated how closely naval strategy and national policy are tied together. The country has never really had any stable naval policy.

In the Revolutionary war we had a few frigates that individually did well, but it was the occasional help that the colonies received from the French fleet that enabled them to win their independence. During the War of 1812 our small navy again covered itself with great glory, but our sea-borne commerce during this war was practically stopped on account of the weakness of our navy and this brought great suffering to the seafaring part of the population.

Not only has America never had any naval policy, but the country has been so busy in its own development that it has been difficult to lay down any kind of a policy. Policy is born of the interests of the people, and our people have been so busy with their own affairs that they have taken little reasoned cognizance of international matters.

Before we go too far, however, in laying down a permanent policy as to the comparative size of the American navy, there are several questions that must be carefully considered before any sound naval policy for the United States can be formed.

First: Has human nature so changed that nations no longer lay down policies mainly beneficial to themselves?

Second: Is it true that the leading nations have always been those strong on the sea? If so, just how much world leadership is the United States willing to take? And bearing on the two preceding questions can America avoid accepting world leadership?

Third: Do we need trade outside the United States and what influence has sea power on foreign trade?

Fourth: How serious is the United States with respect to the open door policy?

Fifth: What is America going to do about the Philippine Islands?

The size of the American navy depends on the answers to the questions given above, and common sense dictates that they be answered before the national mind is made up as to how much of a cut shall be recommended in the next naval disarmament conference.

It is unfortunate but true that few Americans know much about their navy. I will point this out by a simple illustration from naval tactics. In a normal naval battle destroyers are used to fire torpedoes at the head of the main battle line of the enemy. The destroyers do not come up from astern and fire at the capital ships, because with the capital ship making 21 knots and the torpedo only about 28 knots, it would take a long time for the torpedo to catch up with the the heavy ship. The torpedoes make a white streak in the water so, if they are gaining very slowly on the battleship, there is time for the latter to move off to one side and dodge the torpedo. If the torpedo is fired from ahead, however, the ship and torpedo are approaching each other at about sixty miles an hour, or a mile a minute, so there would be little time for the ship to get out of the way of the torpedo.

Modern naval tactics, then, provide for the destroyers to attack on the bow and the defense against this attack is to keep light cruisers ahead of the battle line to shoot the flimsy destroyers out of the water before they can fire their torpedoes. To answer this light cruisers are sent along with the attacking destroyers to take care of the enemy light cruisers while the destroyers are attacking.

Take now the case of the British, for example. We are at war and are trying to make a destroyer attack on their battle line. We send in our destroyers, supported by light cruisers, but the British light cruisers are out there on the bow of their battle line—four of them to our one—and we cannot get home with our attack—the numerical odds are too much against us.

Now reverse the situation—British destroyers supported by their light cruisers—four to our one—come down on our bows to attack. We must assume that *four* British cruisers can knock out *one* of ours—so the British destroyers *could* get home their attack. In other words, the British could use their destroyers successfully against us where we could not use ours against them with any measure of success. At present they have us at a tremendous tactical disadvantage; naturally they will keep us at that disadvantage as long as possible. As regards light cruisers, the Japanese also have us in a tactical inferiority, though their cruiser strength is only two to our one, as compared to the British ratio of four to one.

Number of Cruisers Not Limited

The matter of comparative cruiser strength was taken up in the Washington conference in 1922. The size of the cruisers was limited to 10,000 tons and the size of guns to 8-inch, but the conference made no headway as to limiting the number of cruisers each nation should have.

No blame can be attached to the naval disarmament conference in Washington for the position of inferiority of the United States with respect to light cruisers or torpedo attacks by destroyers. The responsibility here is on congress which permitted other nations to get so far ahead of us in cruiser strength by outbuilding us. It weakens us doubly for, at the next conference, we shall have nothing to trade against the superiority of the other two strong naval powers in cruisers. "Status quo" is one of the strongest levers used in international conferences. If congress should appropriate for a light cruiser program giving the United States as many cruisers as the strongest sea power, it would probably hurry up the next limitation of armament

(*Continued on Page* 48)

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Naval Architects Stress Need of Up-to-Date Vessels

Annual Meeting Well Attended—Improvement in Shipbuilding—Still Below Needs for Size of Fleet—Thirteen Papers Read on Variety of Subjects

THE Society of Naval Architects and Marine Engineers held its thirty-fourth general meeting at the Engineering Society's building 29 West Thirty-ninth street, New York City on Nov. 11 and 12. The professional sessions, devoted to reading papers submitted, were exceptionally well attended. There was evident a more optimistic feeling in regard to the future of shipping and shipbuilding. The general meeting was called to order by Rear Admiral D. W. Taylor, retired, president of the society.

In his opening address Admiral Taylor emphasized the improvement over conditions a year ago, but that this represented an improvement over conditions which could hardly have been worse. He pointed to the urgent necessity of new shipbuilding as replacements and to modernize the merchant fleet if we are not to lose the advantage gained due to the war-building period. The age of these ships and the rapid development of economical power, greater speed, and better cargo handling equipment will soon make them obsolete and totally ineffective in competition against modern vessels.

This warning, from a man recognized as the foremost authority on naval architecture and known through many years of faithful and able service to the country as one who does not talk loosely, is of the greatest importance for the immediate future of shipping in the United States and should be heeded. A complete report of the president's address follows:

Presidential Address

One year ago in this hall I ventured the prediction that conditions in the shipbuilding industry would improve. This was not the result of any searching investigation or profound knowledge of the situation but was based upon the very simple proposition that conditions were so bad that any change *must* be for the better. During the past year the change *has* been for the better.

Statistically the improvement has been marked. Suppose we consider the statistics of the bureau of navigation of the department of commerce. This bureau publishes monthly the gross tonnage building and under contract for private shipowners in American shipyards. On Sept. 1, 1925, this comprised 140 steel vessels of 148,127 gross tons. On Sept. 1, 1926, this comprised 215 steel vessels of 263,094 gross tons. This is a gain of 54 per cent in number of steel vessels and 78 per cent in gross tonnage. There was a similar gain as regards wooden vessels but they are a minor factor.

Department of commerce statistics cover the whole field including a large number of river craft and include vessels under contract as well as under construction. If, however, we use the figures from Lloyds quarterly returns which deal only with vessels actually under construction we find as of Sept. 30 the United States credited with 69,866 gross tons in 1925 and 119,723 gross tons in 1926, a gain of 71 per cent.

ADMIRAL D. W. TAYLOR
President, Society of Naval Architects and Marine Engineers

So, however, we look at it, the situation has improved but the statistical gain of over 70 per cent during the year does not mean that conditions are satisfactory or normal. This gain is figured upon the abnormally small tonnage building a year ago and if that had been only half as large the percentage gains would have been several times as great. Comparing the amount of building with what we need to do normally we find that there is still much room for improvement. Thus in 1913 at this time we were credited by Lloyds with 131,800 tons under construction as against 119,723 this year. When we consider the size of our merchant marine in 1913 as compared with what it is now and the normal replacement building appropriate to our present marine we may reasonably conclude that a further gain of at least 100 per cent upon our present building would be needed to place us upon an average building basis.

However, the present world-wide situation is about the same as in the United States. With a world building capacity of nearly 10,000,000 tons per annum, the total tonnage now building is less than 2,000,000 gross as against 3,333,000 in 1913 when shipbuilding was flourishing but world tonnage was only some three quarters of its present total. Again I must call attention to the fact that as regards tonnage the world is overbuilt and underbuilding. This condition *must* change in time but it can change in a *short* time only by a rapid increase in overseas world trade.

As regards technical developments recent progress has been steady rather than startling. The high pressure experimental river steamer built upon and for the Clyde has been completed and tried and was put in service late in the summer. It has been stated that she met the expectations of her designers and we may see further developments along that line. However, of important new tonnage still some 50 per cent is driven by internal combustion engines. For some time now we have had competition not only between steam and diesel motors but in the motor field between the single acting and double acting and the two cycle and four cycle types. The double acting type has gained ground during the year and the marine engineer seems to be steadily improving the two cycle type.

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There is a great lack of and need for more standardization in the internal combustion field and it is to be hoped that our classification societies will exert a good influence in this direction in time.

In connection with motor ships it may be remarked that the tendency to give cargo carrying motor ships higher speeds has been very noticeable of late. There are several reasons for this. Of course the most obvious one is the fact that the fuel cost for the motorship is often—not always—something like 50 per cent of that of the steamer. It is readily understandable that owners instead of saving all of this have concluded to save a part only and use the remainder to develop more speed in spite of greater first cost.

There are other factors present. Motorships so far have been preeminently developed for long distance runs. For such service an increase of speed means much more nearly a proportionate increase of voyages and earnings than for short runs.

A third factor may be mentioned which would undoubtedly have had an effect upon the speed of cargo vessels even if the internal combustion engine had not been developed. More and more, overseas commerce is being carried by the cargo liner rather than the tramp. In a cargo line service, in competition, speed is obviously an excellent talking point, and as in passenger lines the tendency is to increase speed to get the business.

However we may explain them the higher speeds of recent cargo vessels are a fact and when we read of 14-knot and even 15-knot cargo carriers we wonder whether it is not being overdone and if there will not be a reversion to lower speeds in time.

Meawhile I venture to call the attention of our Great Lakes members to the fact that a large 15-knot overseas cargo vessel is nearly twice as speedy as a large 9-mile lake cargo carrier. We all know that on the lakes extraordinary and successful and, may I add, expensive, efforts have been made to save the time spent in port by cargo carriers. Short as the Lake trips are it may be that the time has come to save time under way.

Recently we have seen again the usual pessimistic and optimistic statements regarding the supply of oil available for use.

For my part accepting the statements of the experts as to the oil in our known western shale fields I have complete confidence that even if, or perhaps I should say when, it becomes necessary to fall back on them the engineer with the aid of the chemist will find a way, as he has always done in the past, to supply us with oil and its products at a reasonable cost. Of course oil may be supplanted. For instance, the inventor's dream of an internal combustion engine using powdered coal may come true and succeed in ousting oil from the marine field. Some other development, not even an idea as yet, may do it. If such a result should come, however, in our time, it will almost certainly be because the engineer has found a better way—not because we do not have oil at a reasonable price.

When last we met there were two great questions affecting the nation and interesting peculiarly the members of this society, regarding which there existed—and had existed for years—controversy, confusion and, may I add, though not with critical intent, a lack of action.

I refer to the two questions of aeronautics in the United States and the United States merchant marine.

This society has taken an interest in the technical side of aeronautics from the first as evidenced by papers before past meetings and this meeting, and I am sure I voice your sentiments when expressing pleasure at the progress made during the year as regards policy and organization. With five-year programs for the army and navy and an organization in the department of commerce to foster and develop civil aeronautics the congress has put an end to confusion and inaction. As regards controversy? No. Controversy will be eliminated only by the extermination of controversialists and that is not done in our days. However, a certain amount of controversy does not seriously clog the wheels of progress and has some advantages. Certainly the aeronautical situation is vastly improved.

We have still with us the question of the United States merchant marine, of vital interest to the members of this society. In some respects with regard to it the situation is closely analogous to the aeronautical situation a year ago. We have no Morrow board but the shipping board by resolution of the Senate has been asked to formulate a policy and is busily engaged in this connection at present.

It is too much to expect a 100 per cent perfect result of its labors, or even one a 100 per cent satisfactory to any of the many diverse elements entering as factors into the equation, but the members of this society know well how great is the present need for prompt action and again I feel confident that I voice your sentiments when I express the fervent hope that the forthcoming report will do for our merchant marine what the Morrow board report did for American aeronautics and result in the elimination of confusion and inaction and the reduction to a minimum of controversy.

We can build in the United States ships equal to any and there are building today in two American yards two large liners for coastwise service equal to any in their class, but for overseas service what have we? Many excellent vessels, I would not disparage them, but in the North Atlantic passenger service our leading vessels are the secondhand German ships built before the war converted to transports during the war and reconverted to liners after the war at great expense. In overseas cargo service our vessels are practically all war-time products designed nearly ten years ago, not to supply the service needed today but to carry the maximum deadweight at low speed to Northern Europe. The whole structure of American industry is based upon the principle "scrap the old and obsolete plant, make and use the best." The most pressing need today of the American overseas merchant marine is that, applying this principle, we should begin if only in a small way to replace out-of-date ships by up-to-date ships.

Technical Papers Presented

In the two days' sessions of the society thirteen papers were presented. The titles and authors of these papers with brief abstracts follow:

1. *"Maximum Block Coefficients and the Economic Disadvantage of Full Form,"* by W. J. Lovett, visitor.

This paper is published in full in this issue of MARINE REVIEW.

2. *"Naval Development of Floats for Aircraft"* by Commander H. C. Richardson, C. C., U. S. N., member.

No officer of the navy probably has had a longer connection with the subject of this paper than the author. He was sent to the model basin in Washington in 1911 to assist in the development of proper floats for aircraft. This paper is of great value in that it covers progressively the development of water hulls from the first early crude attempts to the late modern types. The paper is of real practical interest and is illustrated by a large number of photographs and line drawings. There is also a discussion of speeds at which floats will rise from the water with loads.

3. *"Launch of the Airplane Carrier U. S. S. Lexington,"* by S. W. Wakeman, member.

Mr. Wakeman has done a real service to the marine industry in giving complete information of the

(*Continued on Page* 56)

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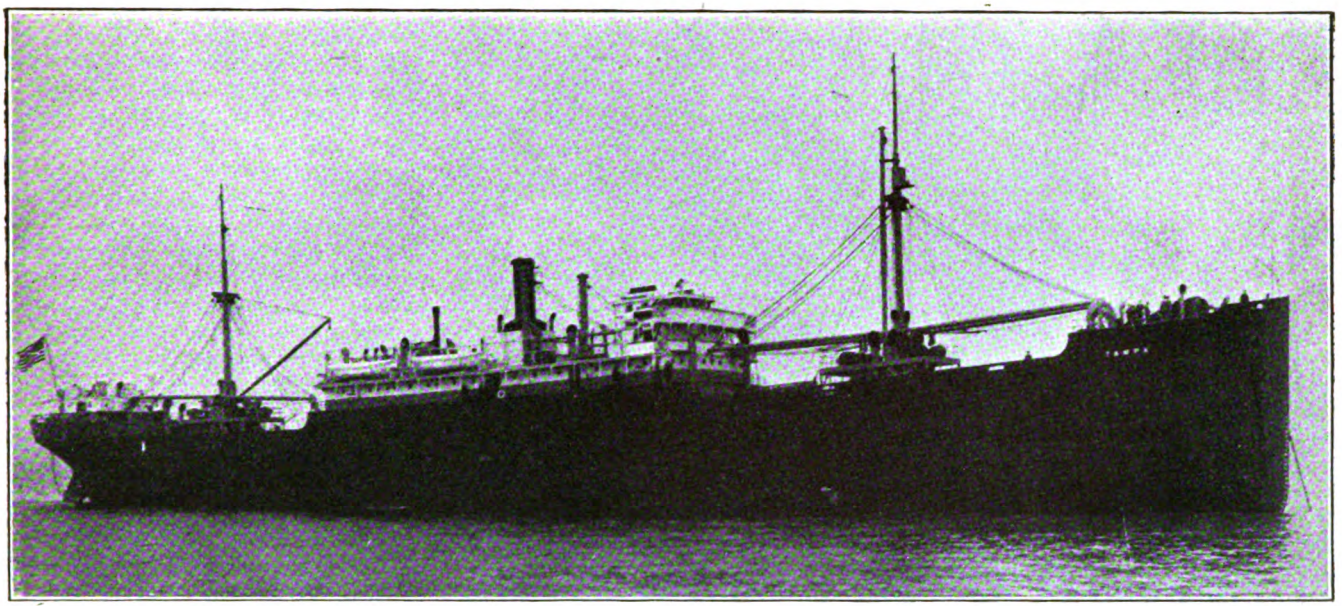


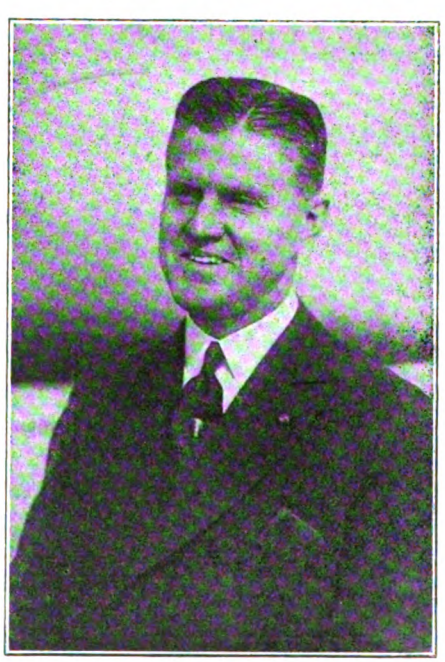
M. S. TAMPA—First Shipping Board Freighter converted from steam to diesel—Anchor test, Hampton Roads Va., Nov. 8, 1926

M. S. Tampa Performed Well On Her Sea Trials

BY A. H. JANSSON

OVER two years ago the United States shipping board by authority of congress began a program of converting 14 steam cargo vessels to diesel drive. In due course contracts were signed for building 14 main drive diesel engines for as many ships. Due to failure of one of the engine builders the present program calls for the conversion of 12 ships.

The first of these converted vessels to be completed was the M. S. TAMPA. Without preliminary trials at sea, with her regularly commissioned crew on board and with 50 invited guests besides many representatives of the shipyard, engine and equipment builders, this vessel completed successful sea trials on Nov. 8, 1926 off Hampton Roads, Va. The day began clear and mild with a light sea running. Guests of the shipping board gathered at Old Point and were taken out to the TAMPA lying at anchor in Hampton Roads on the Newport News Shipbuilding Co.'s tug IDEAL. Leaving her anchorage at about 10 a. m. the M. S. TAMPA made a run of 105 nautical miles, due east to Cape Henry then southeast, then north to Cape Charles returning to Old Point at about 6:00 p. m. The average revolutions per minute during the trials was 98.3 with a brake-horsepower of exactly 2900 and a speed of 13.22 knots. The average indicated horsepower was 3970. The draft forward was 8 feet 6 inches and the draft aft 19 feet 5 inches. She had 800 tons of fuel, 1400 tons of ballast and about 150 tons of stores on board during the trial trip.



CAPTAIN R. D. GATEWOOD

The fuel control valve except for short periods while Professor Lewis of Webb Academy was making torsiograph experiments to check critical speeds between the lowest (28) and highest (100) revolutions per minute, was left in the same position during the entire eight hours of the trial run. On account of the lateness of the hour in returning to Old Point and as a number of the guests were bound for Washington on the steamer leaving at 6:30 p. m. most of the maneuvering tests were omitted, though the main engine was reversed from full speed ahead to full speed astern eight times during the trial.

Engine Operated Perfectly

It was a remarkably successful trial throughout. No untoward incident happened. The TAMPA sailed that evening for Savannah where she loaded cotton for a voyage to Bremen thereby immediately rendering a valuable service to Southern cotton growers now in a desperate plight for ships to move the cotton crop due to shortage of tonnage on account of the British coal strike.

The performance of the TAMPA reflects great credit on the Worthington Pump and Machinery Corp. designers and builders of the main propulsive unit, the first American double acting diesel engine in the first of the 12 vessels to be completed.

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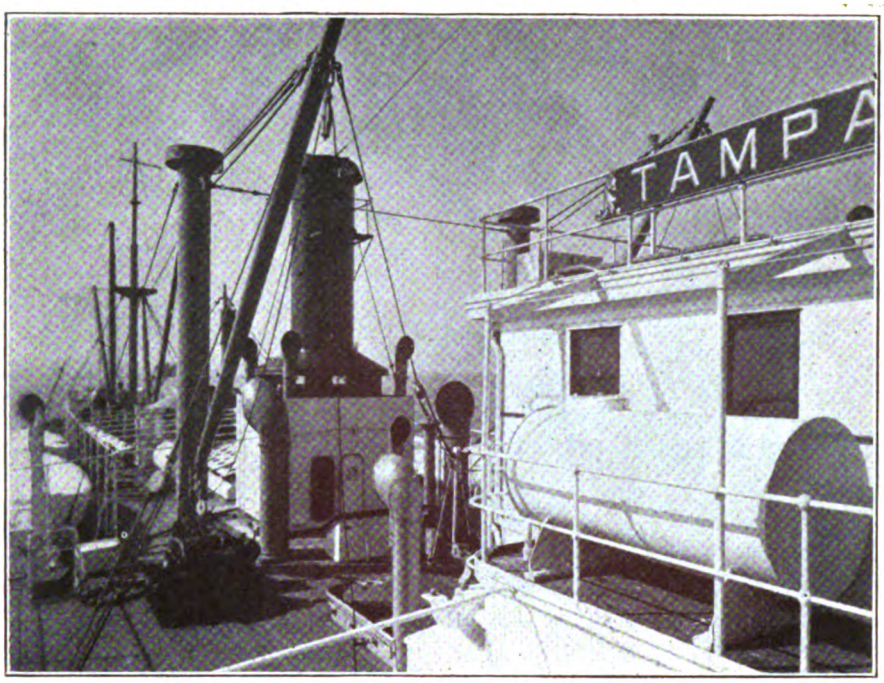
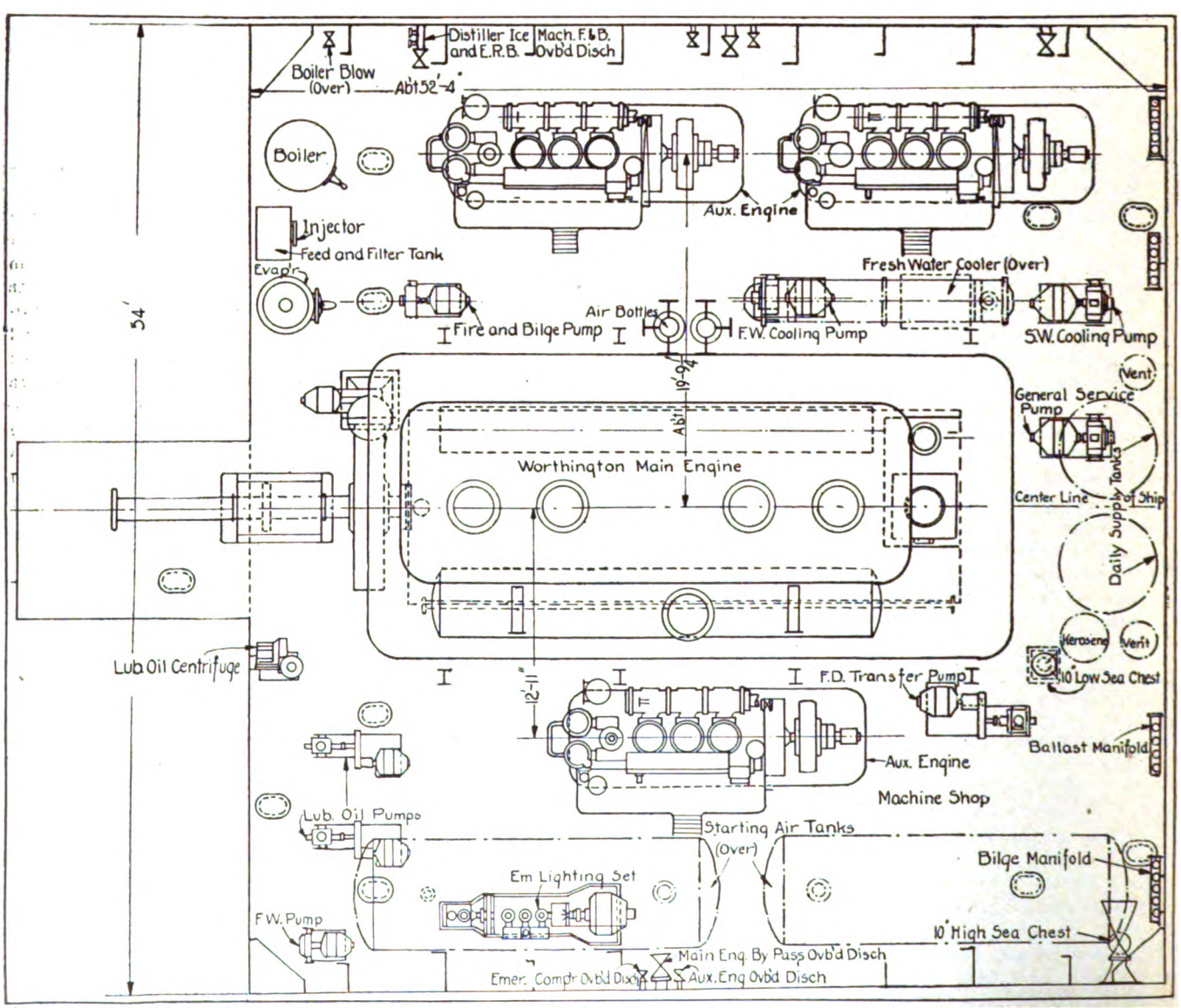


M. S. TAMPA—LOOKING AFT FROM THE BRIDGE SHOWING ONE OF THE TWO WINCHES SERVING NO. 3 HATCH TO BRIDGE SPACE AND HOLD

This engine operated without noise and with the ease and smoothness that one might associate with steam. It operated as if impelled (as it is in fact) by a well controlled slow powerful expansion of a gas with all the resiliency of steam. There was very little vibration in any part of the vessel. No laboring or excessive strain was apparent in close observation of the main engine. An observer would gain the impression that with perfect alignment and proper materials, given fuel, air, lubrication and water for cooling, this engine could keep on running with the same ease and smoothness for years without any appreciable deterioration.

Entire Ship is Modernized

It was not only in her main machinery, but also in the completeness of planning and execution in every department that the TAMPA impressed all practical shipping men that saw her. Criticism has been leveled from many sources at the department of



ENGINE ROOM OF THE M. S. TAMPA—FIRST SHIPPING BOARD FREIGHTER TO BE CONVERTED FROM STEAM TO DIESEL

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maintenance and repair of the Emergency Fleet Corp. because of the method adopted in carrying out the conversion program. It had and still has the appearance of great risk in getting things properly done on account of divided responsibilty. The way it has worked out it might be said that the responsibility lay with the Emergency Fleet officials and they accepted this responsibility with great devotion to duty, intelligence and courage. With the TAMPA as an example, Captain Gatewood, manager of maintenance and repair, and H. E. Brelsford, chief of the technical section, deserve great credit for the final result. The main engines, auxiliaries and every bit of equipment on deck and below were ordered directly on specifications prepared under the supervision of these officials.

To insure as nearly as possible a perfect job every piece of equipment including the main engine was run and thoroughly tested in the shops of the builder before acceptance. It was their responsibilty to see that they got the right design and good quality at a fair price and it was also their responsibility to see that all materials and equipment were delivered in time and in good order to the shipyard doing the installation work. As far as the completed TAMPA is concerned nothing seems to have been neglected. It is apparent that Mr. Brelsford and his staff who have been directly concerned have planned and carried out this work in a very creditable manner aided by the co-operation of the engine and equipment builders and the shipyard doing the conversion work.

Accompanying illustrations show the M. S. TAMPA after conversion. She was originally built for the shipping board in 1920 at the Oscar Daniels Co. shipyard, Tampa, Fla., as a three island, schooner rigged, single screw, steam, steel freighter, on the Isherwood system of framing, 416 feet in length overall and 9550 tons deadweight.

The installation of the main engine and entire conversion and moderniza-

(*Continued on Page* 28)

TABLE I

Principal Particulars Before and After Conversion

Hull	M.S. Tampa	S.S. Tampa
Length overall, ft., ins.	416-0	416-0
Length, B.P.P., ft., ins.	402-0	402-0
Beam molded, ft., ins.	54-0	54-0
Depth molded at side to shelter deck, ft., ins.	33-9	33-9
Load draft, mean normal, ft., ins.	26-10¾	26-10¾
Displacement at mean load draft—tons	13,010	13,010
Gross tonnage, U. S.	5,959	5,948
Net tonnage, U. S.	3,703	3,823
Deadweight in tons on mean load draft	9,120	9,550
Weight of mchy., incl. that on dk.—short tons	550	450
Bale capacity, not incl. deep tanks, cu. ft.	496,710	486,710
Capacity of deep tanks —Salt water tons	1,053	1,051
Capacity, fuel oil tanks —tons	818	800
Steaming radius, days	62	26
Speed, normal in service —knots, allowing 20 per cent for average sea conditions and dirty bottom	11½	9.9
Class A-1 E American Bureau		Same

Machinery M.S. Tampa	S.S. Tampa
Main Engine	Main Engine
One Worthington, 4-cyl., 2 cycle, double acting diesel. Air injection. Stroke, 40 inches. Dia. of cylinders 28 inches. Fuel nozzles—1 top, 2 bottom. I.H.P. 3970, S.H.P. 2900. R.P.M. 95.	One triple expansion reciprocating steam engine 24½x41½x72 ins., dia. cyl., and 48-inch stroke. I.H.P. 2800. R.P.M. 88. Built by Hardie-Tynes Co.
Auxiliaries	Boilers
3—115 B.H.P., 3-cylinder Worthington diesel eng. each direct connected to 75 K.W. Worthington generators, 265 R. P.M. All deck and engine room auxiliaries electric driven. Westinghouse motors for deck machinery. General Electric motors for engine room machinery. Diehl motors for ice machine. 1—electric steering gear. 10 — Lidgerwood electric winches. 1—American Eng. Co. windlass rebuilt to electric drive.	3—Water tube — oil burning Badenhausen marine type. Superheated. Total heating sur. sq. ft., 9630. Working press. lbs. gage 200. Superheat degrees Fahr. 45. One induced draft fan, turbine driven cap. 60,000 cu. ft. P.M.
	Auxiliaries Steam driven. Two—10 K.W. turbine driven generator sets. Steam Motor Co. turbines—G. E. generators.

TABLE II

Auxiliaries on the M. S. Tampa

Below Deck

Generators—Three; 3-cylinder, air injection 12½-inch diameter by 18¼-inch stroke; 115-brake horsepower with 75-kilowatt generators at 240 volts and 265 revolutions per minute; excess air capacity 170 cubic feet each; built by Worthington Pump & Machinery Corp.

Starting Air Tanks—Two, 550 cubic feet capacity; 400 pounds maximum working pressure.

Silencers—For main and auxiliary engines; made by Maxim Silencer Co.

Pumps, Water—One, salt water cooling, 750 gallons per minute self-priming centrifugal with 30-horsepower motor drive. One, general service, 750 gallons per minute self-priming centrifugal with 30-horsepower motor drive. One, fresh-water cooling, 500 gallons per minute self-priming centrifugal with 30-horsepower motor drive. One, fire, 200 gallons per minute centrifugal with 20-horsepower motor drive. One, engine room bilge, 300 gallons per minute, self-priming, centrifugal with 7½-horsepower motor drive. One, sanitary—salt water, 70 gallons per minute, centrifugal, with 7½-horsepower motor drive. One, sanitary—fresh water, 70 gallons per minute, centrifugal, with 7½-horsepower motor drive. All of the above pumps were built by the Nash Engineering Co. and were all especially re-designed for the diesel conversion program to meet the special requirements and this is the first ship to have this equipment. The electric motors were furnished by the General Electric Co.

Pumps, Oil—Two lubricating oil, 150 gallons per minute rotary plunger, with 7½-horsepower motor. One, fuel oil transfer, 250 gallons per minute, rotary plunger, with 20-horsepower motor. These pumps were made by Kinney Mfg. Co. and are also of special design. The motors were furnished by the General Electric Co.

Boiler—Vertical type, 210 square feet heating surface, working pressure 110 pounds gage; oil burner—Sunbeam centrifugal atomizer. One, boiler feed pump 2 x 3 x 3 inches made by Worthington.

Ice Machine—One, York, 2-ton amonia direct expansion type, direct driven by a Diehl motor at 235 revolutions per minute.

Propeller—Four blades, sectional type, bronze, diameter 17 feet 0 inches, pitch 13 feet 6 inches.

Deck Auxiliaries and Miscellaneous

Steering Gear—Original steering gear made by the American Engineering Co., used with cylinder and base plate removed and electric motor of 25-horsepower substituted to drive the gear through Cleveland Worm Gear enclosed gears and Falk-Bibby coupling. Steering control is by means of Sperry electric telemotor with Westinghouse control panel giving three methods of steering viz, automatic, hand with automatic follow-up, and hand with nonfollow-up.

Winches—Ten cargo and one warping of special design, self-oiling and electric driven, built by Lidgerwood Mfg. Co. and with Westinghouse 25-horsepower motor and improved cam-type controller. The winches are fitted with shoe brakes of Cutler-Hammer make.

Windlass—The original windlass of American Clay make was retained and rebuilt for motor drive. Westinghouse 45-horsepower motor and control panel and Cutler-Hammer shoe brake are used.

Fire Extinguishing System—The Lux system CO_2 consisting of 80 50-pound cylinders for CO_2 and 24 hand containers for CO_2. This system is made by Walter Kidde Co. There is also a fire main (water).

Radio—Complete equipment installed by the Radio Corp. of America.

Galley—An oil-fired range of New York French Range Co. fitted with Ray burner. Coffee urn and water boiler of electric type supplied by Automatic Electric Heater Co. Capacity, coffee 5 gallons, water 14 gallons. Hot water heaters, one main, 100 gallons capacity. One for the crew of 15 gallons capacity both furnished by the Automatic Electric Heater C. Electric radiator in carpenter shop.

Whistle—Of Sperry visible type.

Search Light—One, 1000-watt with incandescent lamp, made by Sperry Gyro Co.

Emergency Air and Lighting Unit—One, made by Mianus Diesel Engine Co.; 2-cycle, 3-cylinder, 5 5/16-inch diameter by 7⅛-inch stroke; 22-brake horsepower, at 550 revolutions per minutes, driving 14-kilowatt Diehl generator and 14½-cubic feet per minute compressor.

Centrifuges, Oil—Two, of 300 gallons per minute capacity for fuel oil and one, of 150 gallons capacity for lubricating oil all supplied by Sharples Specialty Co.

Pump, Vacuum—One, horizontal 5½ x 8 x 7 inches supplied by the Warren Steam Pump Co.

Injector—One, for use in supplying water to the vertical donkey boiler.

Thrust Bearing—One, of Kingbury single collar type 28 inches in diameter.

Switchboard—One, made by Walker Switchboard Co.

TABLE III

Tampa Conversion Costs:

Installation	$210,000
Special alteration	125,000
Main engine, including spares	125,000
New shafting, including hub	9,000
Deck machinery, including steering gear, motors, control and cable	29,321
Engine room auxiliaries, including engines, generators, pumps, coolers, switchboard, cable	80,700
Repairs	26,000
Equipment and outfit	25,000
Engineering, purchasing, inspection, traveling, freight, extras, trial trip and incidentals	23,000
Total	$740,021

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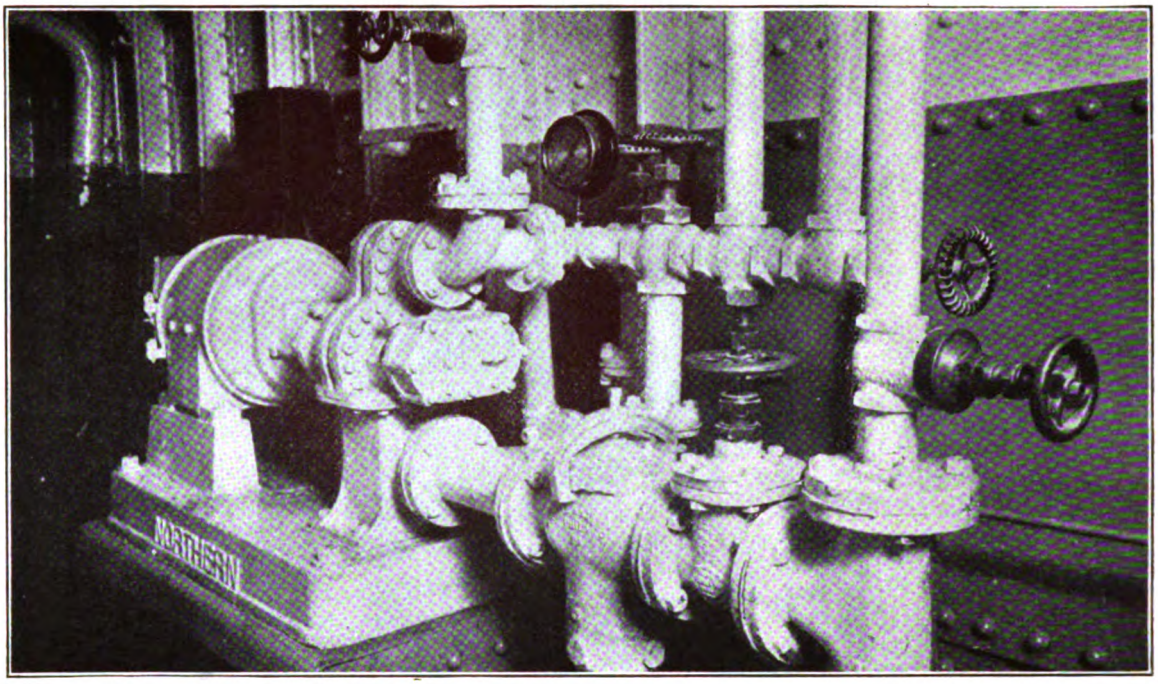
Electric Driven Auxiliaries Lower Operating Costs



Motor driven circulating pump on the 870-horse power diesel electric tugboat VAN DYKE III

Electric Drive for Auxiliaries on Diesel Ships Has Demonstrated Economies in Fuel and Up-Keep—Highly Developed for Marine Service in Both Steam and Motor Ships Part II

BY FRANK V. SMITH

A TYPE of motor developed especially for above-deck use in conjunction with anchor windlasses, capstans, and cargo winches, is shown in an accompanying illustration. It is totally enclosed, watertight and carefully made to resist the entrance of water even if submerged for short intervals, and designed for installation on deck without additional protection from the weather. All fittings subject to corrosion, are made of noncorrodible material or have noncorrodible surfaces. The construction of the bearings is such that, should water creep along the shaft, it enters a drainage chamber located at the outer end of each bearing housing, which drains into the motor frame and thence to the outside through check valves which are situated at each end of the motor frame near the bottom to give complete drainage.

One of the early difficulties encountered in deck auxiliary electrification was due to the attempt made to use motors intended primarily for land service. The early trials, although of great engineering value, inasmuch as all the weak points were brought rapidly to the surface, resulted in much criticism and prediction of failure. The rapid manner, however, in which all the difficulties have been surmounted is a great credit to the electrical manufacturers, and thanks is due to the motorship for forcing the issue and making it worth while for the electrical manufacturer to really design special equipment for meeting the peculiar conditions required in sea service.

Under-deck Auxiliary Electrification

The policy on all new motorship construction is to completely electrify the auxiliary equipment both for deck and underdeck. On reconditioned vessels (steam to diesel drive), electric engine room auxiliaries are also favored. As to the electrification of the deck auxiliaries on such reconditioned vessels, opinions differ, and to date, it has been about a fifty-fifty proposition.

The full economies, due to electrification, are difficult to show on a dual basis. One of the principal items of expense in auxiliary electrification is the generating plant. Increased capital expenditures are best warranted when the machinery, so represented, is kept in operation. Keeping such equipment busy at sea, but not in port, means that part of the principal economical advantage is lost.

On steam vessels of all types, there has come about a distinct realization on the part of operators of the large proportion of fuel which is used for auxiliaries alone; on some types of ships operating at full power, the percentage is as high as 40 per cent of that used by the main engines. When operating the main propelling ma-

The author, Frank V. Smith, is an engineer attached to the Federal and Marine department General Electric Co. Part I of this article appeared in the November issue of MARINE REVIEW.

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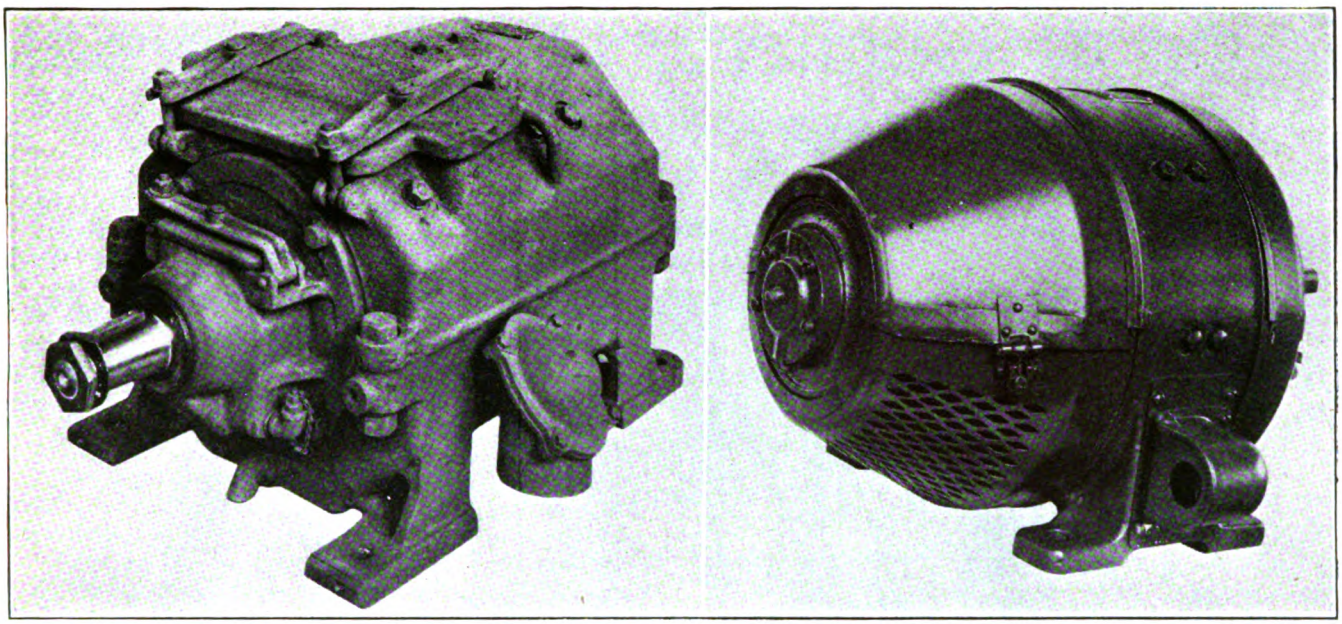


At Left—Totally enclosed waterproof direct current motor for deck auxiliaries--Brake to commutator end—At right—Drip proof fully protected marine type motor (Ball Bearing for under-deck auxiliaries

chinery at reduced powers, the auxiliary fuel consumption does not drop in the same proportion, and under such conditions, the percentage fuel used for auxiliaries may be as high as 75 per cent of that used by the main unit.

Another item of great importance to steam vessels is the securing of a proper heat balance. An excess of auxiliary exhaust steam above that which may be absorbed by the feed heating system, shows a tremendous loss. In steam plants, losses invariably pyramid. Where excess auxiliary exhaust steam is piped to the condenser, through a relief valve, the vacuum is affected or increased power is required on the circulating pump; this, in turn, requires more steam, therefore, a larger amount of feed to the boilers, which increases the duty of the feed pump. Fuel oil pumps and forced draft blowers are also speeded up slightly, and we find ourselves in a vicious circle. Economy in steam practice depends primarily in breaking up these pyramidal losses.

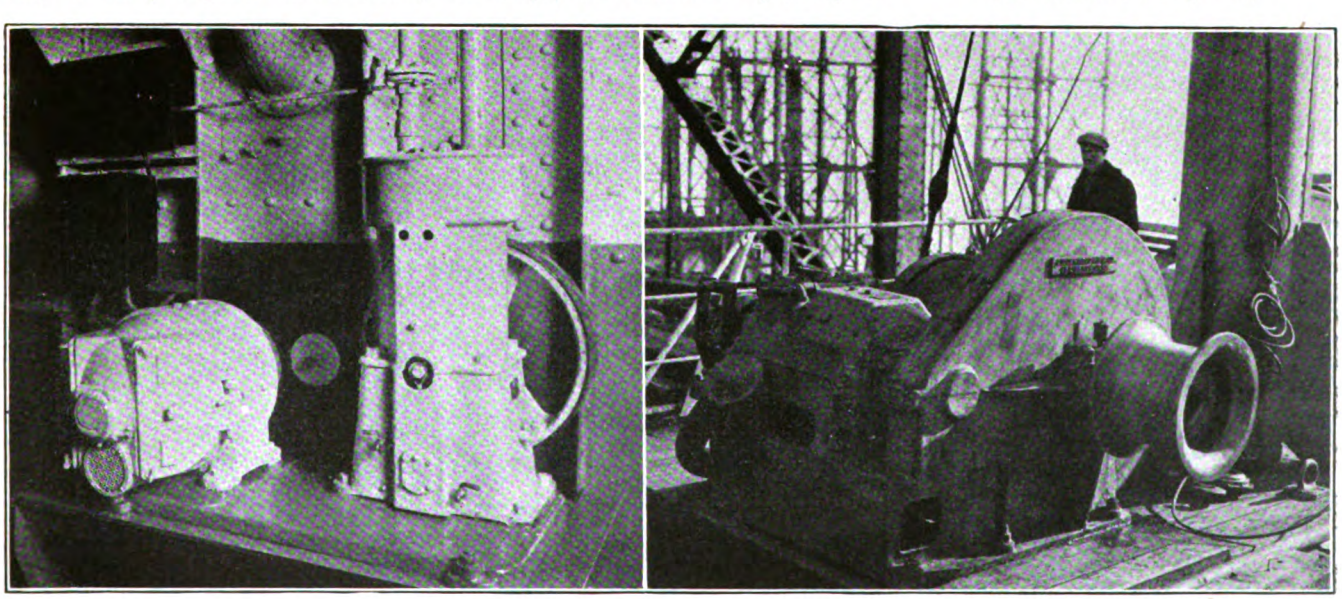
The great economic benefits to be derived through partial or total electrification of the engine room auxiliaries is, therefore, due not only to the higher thermal efficiency of the individual pieces of apparatus, but also to the realization of a proper heat balance and the elimination of unnecessary losses.

In the average steam installation on ships, tne maximum quantity of auxiliary exhaust steam that may be absorbed by the feed water heating system is from 12 to 15 per cent of the total quantity generated.

The main propelling machinery has been highly developed the past few years, steam conditions have been improved and water rates have been reduced. The percentage of steam used for auxiliaries has, therefore, become higher rather than lower, which further complicates the problem. In order to keep a well balanced plant, especially where highly efficient main propelling units are installed and where high pressure and temperature steam is used, electric auxiliaries become almost a necessity.

The application problems involved

(*Continued on Page* 40)



MOTOR DRIVEN COMPRESSOR ON THE DIESEL ELECTRIC TUG VAN DYKE III OWNED BY THE ATLANTIC REFINING CO.—25 HORSEPOWER, 310 REVOLUTIONS PER MINUTE, 230 VOLT ELECTRIC CARGO WINCH WITH WATERTIGHT SOLENOID TYPE BRAKE ON THE M. S. EAST INDIAN OWNED BY THE FORD MOTOR CO.

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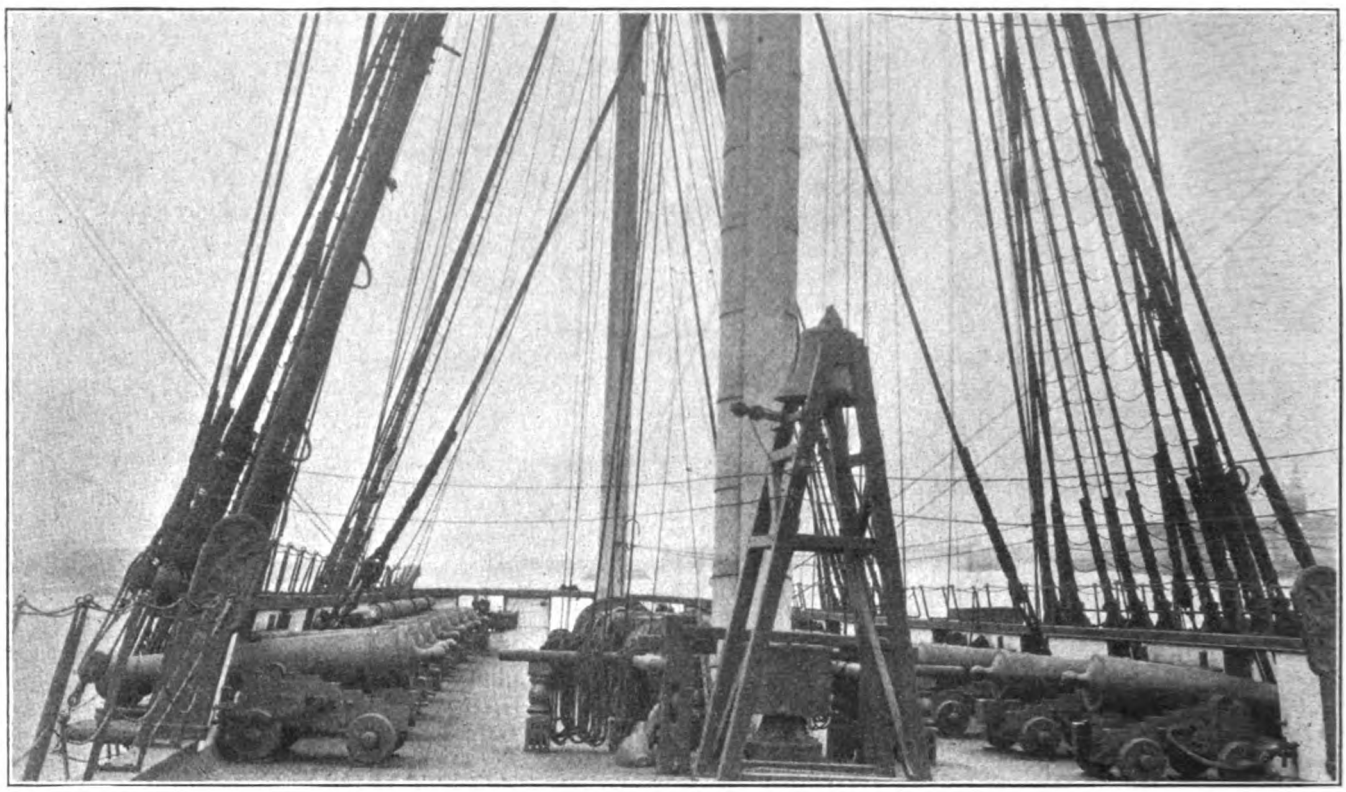
Guns & Gunnery, Old Ironsides-II.

Historical Research on the Oldest Ship of the Navy —Interesting Facts on Her Cannons and Equipment

BY ELLIOT SNOW
Rear Admiral (C. C.) U. S. N., Retired



U. S. S. CONSTITUTION—spar deck looking aft showing the sixteen 32-pounders on the after part of the spar deck, called the quarter deck

APART from the insurmountable obstacle of funds, the yard authorities were unable to locate a single one of the CONSTITUTION'S old guns. In fact, this one point was by far the most difficult to solve even with a modicum of satisfaction. The statement therefore that "when the CONSTITUTION was reconditioned in 1906, the government found one of her old 24-pounders and for convenience they cast 54 guns from that pattern" needs correction. The reasons really were lack of funds and lack of information.

A short account of the efforts made to locate information as to this battery is worthy of record here. The material bureaus of the navy department were unable to throw any light on the whereabouts of the battery or whence correct and accurate information could be obtained. The files of the public library of Boston were consulted and there a book was found published in French during the Reign of Terror. This gave considerable information as to the artillery designs near the end of the eighteenth century; this was consulted because it was conceived that we had borrowed ideas of guns from France as well as England. This book had been acquired by that library some thirty-five years earlier and its first issue for public use was in connection with the restoration of the CONSTITUTION.

The Naval War of 1812 by Theodore Roosevelt was also consulted, and on pages 17 to 19 of the introduction sketches of a long gun and a carronade were found, also a cross section showing in a general way their mounting, but none of these gave any dimensions or details. At the bottom of page 19, a reference was found to the *American Artillerists Companion* by Louis de Toussard, Philadelphia, 1811. A copy of this was located finally, as I now believe, in the library of congress. This coupled with Roosevelt's work, and the French publication, were the main sources from which the data were drawn. Knowing the weight of the ball fired, and allowing for the windage, the draftsman assigned to the work, was finally able to establish an approximate scale from which to produce the plans for the guns and their carriages.

The present guns of the CONSTITUTION are not as heavy as might be thought, upon casual surface inspection. As a safety precaution against the use of these guns for saluting purposes by enthusiastic but uninformed laymen should the battery ever be lost in the long years to come, a diaphragm was cast across the bore about one foot back from the muzzle. To save weight and expense, the remaining part of the guns have a very thin wall. As a further precaution the vent from the powder pan (where the priming powder was touched by the glowing slow match), was left undrilled into the inner thin-walled powder chamber. These devices had to be adopted to keep the expenditures within the appropriation and yet in the end have a fairly finished

This is part II of the article on the Guns and Gunnery of Old Ironsides. Part I appeared in the October issue of MARINE REVIEW. Part III will appear in an early issue.

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ship upon which lovers of the sea and its navy might look with pardonable pride.

A War Office letter, bearing date of Sept. 13, 1796, was found by a colleague, when searching the archives of the navy department for information about the timber used to build the U. S. S. CONSTITUTION. The secretary of the treasury is informed by this letter that:

"There will be wanted for the frigate destined for the Mediterranean twenty-four 9-pounders and twelve 6-pounders and for the three frigates now under construction forty 12-pounders."

The frigate destined for the Mediterranean was the 36-gun frigate CRESCENT built by us; for tribute to the Dey of Algiers. We need not hang our heads because of the conditions which gave rise to those words written so long ago, for now, we realize that the United States did but keep its words. It did not "scrap" its treaty of amity with Algiers, onerous as it was. The other three frigates for which the forty 12-pounders were wanted, were the UNITED STATES (44), building at Philadelphia; the CONSTELLATION (38), building at Baltimore, and the CONSTITUTION (44), building at Boston. This letter of Sept. 13, 1796 contains much of interest and as it forms the basis of the research which led to this article, it is quoted in part. The omission is a table of "defects to be tolerated in cannon for the use of the marine of the United States," which has been published elsewhere.*

War Office, Sept. 13, 1796.

"The Secretary of the Treasury.
Sir:

"There will be wanted for the frigate destined for the Mediterranean, twenty four 9-pounders, and twelve 6-pounders, and for the three frigates now under construction forty 2-pounders; it is requested therefore that a contract may be entered into for the delivery of this number of cannon on or before the first of April ensuing.

"To obviate as much as possible dispute with the person who may engage to furnish them, it may be proper that the contract should comprise the following conditions.

1. That the guns be cast in the solid and bored.

2. That the twenty four 9-pounders and twelve 6-pounders conform exactly in weight, bore, caliber, and length to British ship guns of the same dimensions now in use.

3. That the forty 12-pounders be formed agreeably to the dimensions laid down, in the annexed draught.

4. That the guns after having been bored and before undergoing any proof, shall be examined by one or two persons to be appointed by the President of the United States, in the presence of such other person as shall be named by the owner of the works. That this examination shall commence by a verification of the diameters of the different parts and external cavities or defects that are specified in the annexed table, exhibiting the defects which are to be tolerated. That in all cases where the bore or caliber is found to be less than the diameter prescribed, and the defects not greater than those tolerated, the cannon shall be returned to the boring machine, to be enlarged, before being proved; and in all cases where the defects are greater than those tolerated, the examination shall cease, and the cannon be rejected.

5. That the instruments commonly employed to ascertain dimensions, and discover cavities or holes in the external and internal parts of guns shall be used on such occasions.

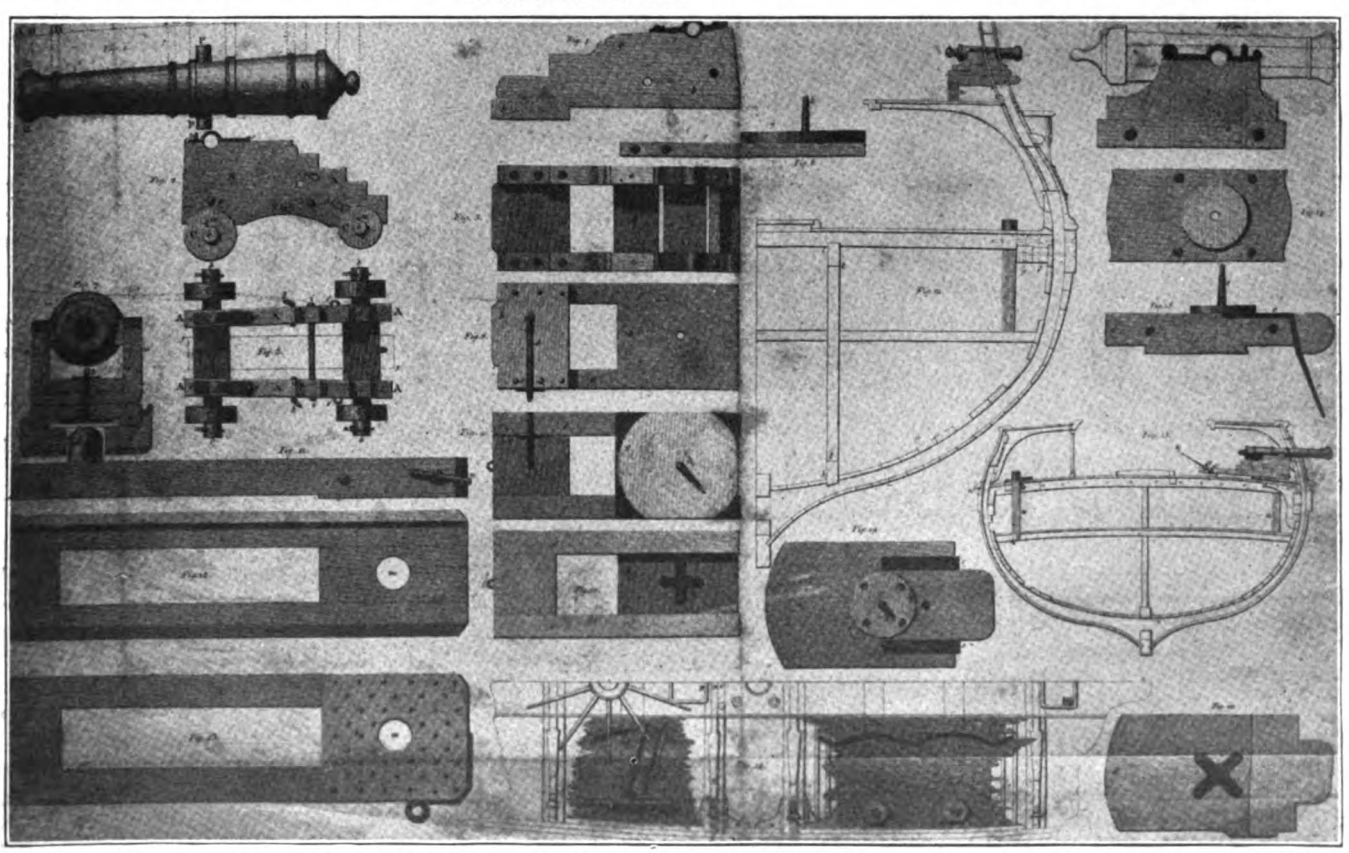
6. That the touch-hole must end in the cannon, at the middle of the rounding of the angle at the bottom of the bore. That should any holes be found in the touch-hole, deeper than the twentieth of an inch, the cannon cannot be admitted to proof, till the same shall have been filled up with beaten iron.

7. That the trunnions must be perpendicular to the vertical plane, which is supposed to pass through the touch-hole and to cut the bore into two equal parts. That the upper part of the trunnion shall be level with the center of the caliber, or bore, and that the usual relative weight be preserved between the breech, and chace.

8. That the proof by powder shall be as follows, viz: Each cannon shall be proved by two successive discharges. The weight of the powder for the first discharge shall be equal to half the weight of the ball. The cartridge shall be well rammed down with a wad over it; two balls shall be placed over, which shall be well rammed down; the balls to be measured so as to allow a sufficient windage, and approved of by the officers who shall

(*Continued on Page* 52)

*"The Battery of Old Ironsides"—Army Ordnance, November, 1925.



Details of 24-pounder "Iron Guns," carriages and mounting, from "American Artillerist Companion," Louis le Toussard, Philadelphia, 1811

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From the Old Log Book

Stray Items About the Great Lakes, Atlantic, Pacific and Gulf Coasts and Inland Rivers from MARINE REVIEW Files of 10, 20, 30 and 42 Years Ago

December 1884

THE following interesting item concerning one of the world's most famous ships appeared in the *Marine Record*, then the name of MARINE REVIEW and a weekly, for Dec. 4, 1884.

* * *

THE steamer GREAT EASTERN, it will be recalled, was built on the river Thames, England between 1854 and 1859. She is 680 feet long, 83 feet wide and 58 feet deep, and draws 30 feet of water when she displaces 27,000 tons. She has both paddle wheels and screw. The paddles are 56 feet in diameter. She has eight engines for the paddles and four for the screw, and develops 10,000 horsepower, but her speed is only 15 miles an hour, or 360 miles a day. The OREGON in her fastest passage covered 430 miles for the 24 hours. The GREAT EASTERN has seven masts and five smokestacks, so that she is not likely to be mistaken at sea for any other vessel. As a passenger ship she was a failure, mainly owing to her being too deep for most of the harbors.

* * *

WHEN the vessel built by Capt. Andrew Robinson of Gloucester, Mass. in 1713, which he had masted and rigged in a peculiar manner, was launched, we are told that her strange skipping motion as she glided into the water caused one of the bystanders to exclaim. "O, how she scoons." Robinson instantly replied, as he dashed a bottle of holy water (rum) against her bows, "A schooner let her be." And that is the old story of how this famous and distinctive American sailing vessel got its name.

December 1896

IT IS interesting to note that thirty years ago Harland & Wolff, Belfast, Ireland, even at that time leaders in the building of big cargo steamers, had completed a slip on which it was possible to build a vessel 700 feet long. This length has long since been exceeded and it would not be surprising if this same firm will soon commence building a 1000-foot transatlantic liner.

* * *

THE trial of the steamer R. P. RANNEY *a wooden vessel owned by M. A. Bradley was made Nov.* 19, 1896. *She was an old wooden vessel with compound reciprocating engines with* 20 *and* 46*-inch diameter cylinders and* 48*-inch stroke. The steam pressure was* 140 *pounds on one trial trip. The total indicated horsepower was* 514 *and the revolutions per minute were* 76. *There were two trials each lasting* 6 *hours and* 4 *minutes. Two pounds of coal were burned per indicated horsepower per hour.*

* * *

IN HIS annual report, 1896 Chief Constructor Hichborn of the navy made a plea for funds to complete the tank in which it was proposed to try out models of vessels. Constructor, Hichborn was evidently successful in his plea as it was not long after this that the model tank was completed. Under the leadership of Admiral D. W. Taylor, for many years in charge, the model tank became of great value to the science of naval architecture and shipbuilding.

December 1906

AT THE meeting of the Society of Naval Architects and Marine Engineers 20 years ago the two papers of outstanding interest were, A Fireproof Ferryboat by F. L. Dubosque and Construction of A Fireproof Excursion Steamer, by William Gatewood. These two papers were read and discussed jointly.

* * *

THE speech by Secretary Root, Nov. 20, 1906 *at Kansas City was strongly commended by* MARINE REVIEW. *A number of the suggestions then made by the secretary have in the past twenty years been acted upon much to the good of our country. One of the most important points he made was, that we must establish lines of American steamships with the leading South American countries. This has been done and the South American service of the Munson Steamship lines is firmly established with the result that great benefits accrue to our business relations with the growing republics of South America.*

* * *

THE much talked of difference in cost of building ships here and abroad is not of recent origin. In the MARINE REVIEW for Dec. 20, 1906 the testimony of Edwin S. Cramp before the committee on merchant marine and fisheries was alluded to in showing the wide diversion then existing between bids in Britain and United States for the construction of a tank steamer about 500 feet long for the Standard Oil Co. Harland and Wolff offered to build the vessel for $613,500, the lowest European bid. The New York Shipbuilding Co. bid $1,024,800, the lowest American offer. Blohm and Voss were the highest foreign bidders at $852,150, while the highest American bidder was the Fore River Shipbuilding Co. at $1,260,000. Labor cost was responsible.

December 1916

THAT there are hazards of the sea on the Great Lakes as well as on the oceans is brought out forcibly in MARINE REVIEW ten years ago. On Oct. 20, Lake Erie was swept by a gale which caused the loss of 50 members of the crew of four ships which went down. The gale was of unusual severity, exceeding in the opinions of several captains, the velocity in the great storm of November 1913. This storm took the lives of 248 and caused the loss of 17 vessels. During the season of 1916 through November, 11 vessels and 71 lives were lost on the Great Lakes.

* * *

TEN years ago, P. A. S. Franklin recently appointed president of the International Mercantile Marine Co. proposed to build four fast steamships for the American line. It was understood at the time that these vessels were to be built in American yards. The plans called for oil burning, quadruple turbine steamships of about 32,000 *gross tons with a speed of* 25 *knots or more.*

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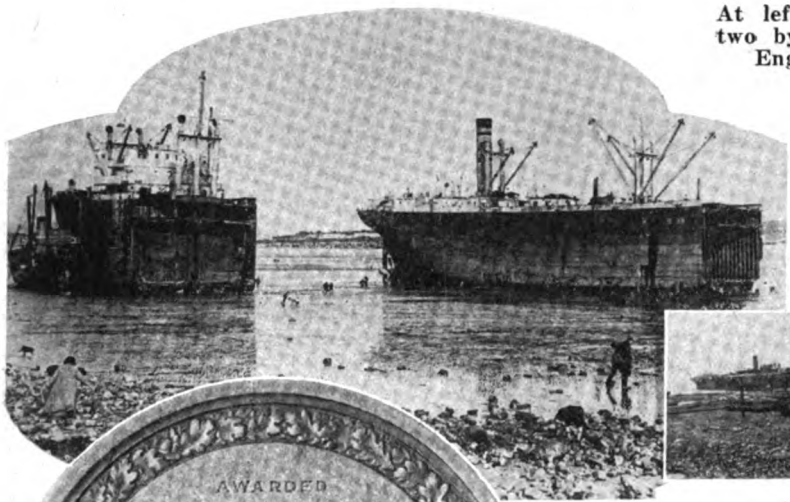
Latest Marine News in Pictures



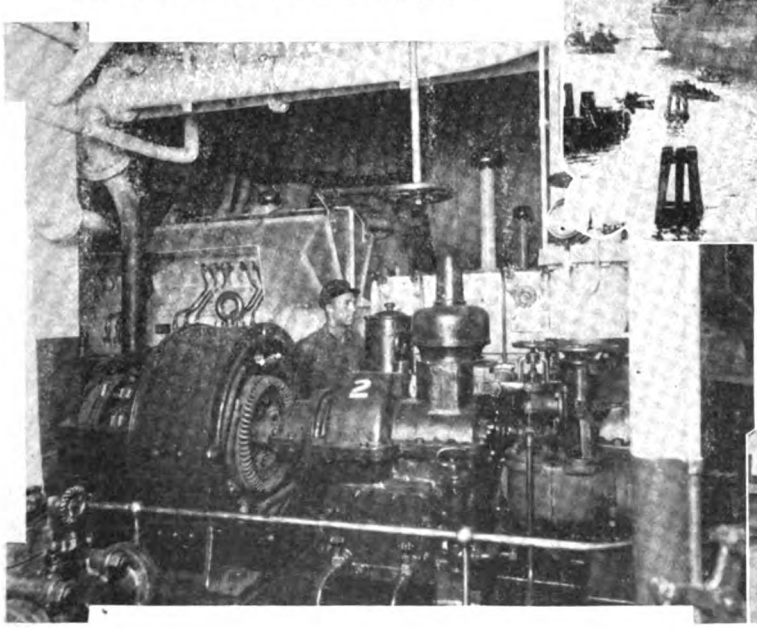
At left—Italian s.s. Valsesia wrecked and broken in two by the force of the waves off Bary Island near English coast. Her cargo of coal was salvaged

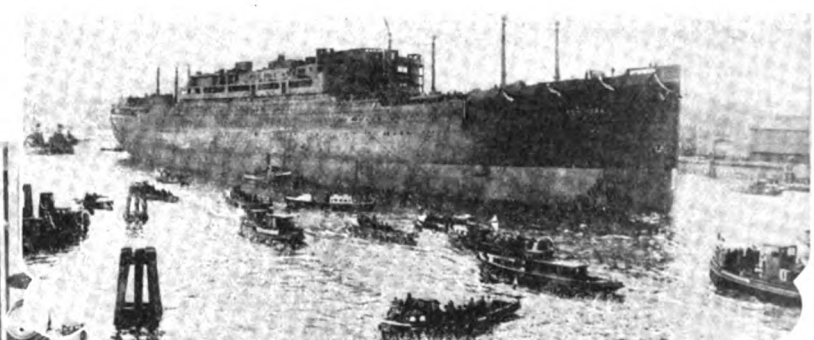
Above Old Empress of Japan laid up at Vancouver, B. C. This vessel built at Barrow over thirty-six years ago inaugurated in 1901 the famous transpacific service, Vancouver to the Orient

Left to right—Capt. Harold A. Cunningham, of the George Washington; Gen. A. C. Dalton, president of the Emergency fleet, and Capt. Herbert H. Hartley, of the Leviathan. Taken Oct. 22, on the Leviathan when General Dalton presented to Captains Hartley and Cunningham commissions as commodore and vice commodore respectively of the U. S. Lines

Carferry Milwaukee in harbor at Milwaukee

One of the three Westinghouse 75-kilowatt generators on the Coamo of the New York and Porto Rico Steamship Co.





Hamburg American liner New York launched at Blohm and Voss, Oct. 20. Christened by Mrs. James J. Walker, wife of New York's mayor

Tug Meyer, towing steamer Denmark at Milwaukee

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Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHERE a charterer's rights as to salvage are defined by agreement between the parties, the charterer cannot rise to a higher position than that of being a joint adventurer with the owner in respect of salvage services performed by the chartered ship; the owner and the charterer may adjust rights in the salvage recovery by the owner's execution to the charterer of an off-hire certificate without objection thereto from the owner of the ship liable for the salvage.—Castner, Curran & Bullitt, Inc., v. United States, 5 Fed. (2d) 214.

* * *

THE arbitration law of New York, though affording a remedy in respect of a charter party, it was said in Atlantic Fruit Co. v. Red Cross Line, 5 Fed. (2d) 218, has no effect on whatever remedy admiralty offers for settlement of disputes arising under the same charter party; and noncompliance with agreement in a charter party to arbitrate disputes arising under the charter party did not bar suit in admiralty for nonpayment of charter hire and expenses.

* * *

THOUGH a maritime lien is waived by accepting credit of the owner of a vessel, an agreement that wages of the crew of a dredge belonging to a subcontractor, which were paid by the contractor, should be repaid out of eanings of the dredge, did not waive the contractor's lien on the dredge for wages paid; and a bridge contractor, which advanced wages of the crew of a dredge belonging to a subcontractor in order to carry on work under contract, was not a mere volunteer and was entitled to be subrogated to the crew's lien against the dredge.—Fielder v. Bay Construction Co., 5 Fed. (2d) 227.

* * *

IT WAS decided in the case of United States v. Lester F. Alexander & Co., 5 Fed. (2nd) 230, that where a steamship was helpless at sea and was in some danger, though danger was not imminent, and was towed by one tug to safer anchorage where the master could conveniently make all arrangements for towage to another point, and was towed by another tug to such point, allowance of salvage for services rendered by both tugs was proper.

* * *

SPEAKING of international rules, arts. 20, 22, the court, in the case of BUENOS AIRES, 5 Fed. (2d) 425, said: "The rule which requires a steam vessel too keep out of the way of a sailing vessel when proceeding in such directions as involve a risk of collision seems to have been a rule of navigation in the United States as long as steam has been used as a motive power. The reason lies in the fact that the motive power of the steamer is under human control and is at all times available, while the motive power of the other is not. 'The wind bloweth not only where it listeth, but when it listeth. . . It may suddenly come ahead, or wholly cease; and in the latter case, she [the sailing vessel] would be helpless.'"

* * *

A RIVER steamboat, about to leave a narrow channel, which had signaled to an ocean steamer proceeding up the river that she intended to pass the steamer to starboard, instead of to port, and had received no assent or signal from the steamer, as a precautionary act should have repeated her signals.—FELIX TAUSSIG, 5 Fed. (2) 612.

* * *

BLOWING out of a fuse, causing the electrical steering gear of a submarine to become inoperative and the vessel to swing with the tide and to come into collision with an anchored barge, did not establish the defense of inevitable accident, it was decided in United States v. King Coal Co., 5 Fed. (2d) 780, where the vessel was suddenly put up against a strong running flood tide, throwing on the steering apparatus a load too great for the fuse to carry.

* * *

A SEAMAN injured while returning to his ship from a voluntary trip ashore, because of the defective condition of the wharf, could not recover against the owners of the ship, since the seaman was not in the owner's service at the time of the accident and the owner's duty to provide a safe place in which to work did not extend to a place beyond the premises of employment, where the seaman had gone for his own purposes and over which the said owners had no control.—Todahl v. Sudden & Christenson, 5 Fed. (2d) 462.

* * *

TUGS which responded to the first call for assistance of a stranded ship, and were faithful and efficient about their work, should be reasonably compensated, according to the decision in the case of SANTA ROSA, 5 Fed. (2d) 478, though they did not meet with success, and it was thought necessary to call in more powerful and better equipped wrecking crews, which were finally successful. The court also decided that the manager of two of the several tugs which took part in the floating of the vessel having superintended the entire work, a reasonable allowance to him on account thereof was proper.

* * *

NEITHER the United States nor a ship owned and registered in its name at the home port, designated on the stern of the ship, were liable in an action for services of stevedores rendered while the ship was in possession of a corporation to which the government had contracted to sell it, without inquiry as to ownership of the vessel either from those in charge of the vessel or at her home port, since in such case services were rendered without the exercise of reasonable diligence to ascertain the true ownership of such vessel.—LIBERATOR, 5 Fed. (2d) 585.

* * *

TUG, licensed for the coasting trade, was not employed in a trade other than that for which she was licensed, which subjected her to forfeiture under the revised statutes of the United States, by the towing of a lighter 20 miles to sea, where the lighter was laden with liquor from another vessel, and then towing her back to port.—ESTHER M. RENDLE, 5 Fed. (2) 1007.

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Full Form Is an Economic Loss

Maximum Block Coefficients and the Economic Disadvantage of Full Form Analyzed—Larger Capacity Offset by Greater Cost Per Mile

BY W. J. LOVETT

A PAPER on *Block Coefficients of Cargo Vessels* was read by the present writer at the summer meeting of the Institution of Naval Architects held in Paris in 1922, and a method of arriving at these coefficients was given.

The coefficient values were based on available and published records of the results of model experiments, and are intended to be applied to vessels having midship-section coefficients within the limits of 0.96 to 0.99 and length between 350 feet and 550 feet and having $\frac{V}{\sqrt{L}}$ values from 0.50 to 0.70.

Model experiment records applicable to cargo vessels were collected, and the results plotted in the form of Froude's C value curves on a K basis. A note was taken in each case of the K value where the first definite steepening of the C curve occured, because this denoted an excess increase in resistance displacement ratio and consequent loss in propulsive economy. This first steepening was found to occur frequently in the vicinity of a C value of 0.70 for vessels of good form and about 400 feet length, and it may almost be said that the proposed block coefficients, if associated with good tank form, have a C value of 0.70 at the designed speed. A smaller C value and consequent reduction in power will be attained if a finer block coefficient is adopted, and the values here given may be taken as maximum fullness of form for economic propulsion. From records in the press and from correspondence it would appear that this method of determining suitable block coefficients has come into fairly general use, and the values as then proposed are given in Table 1 but including also a speculative development for values at the higher speeds, so that the whole table has not hitherto been published.

The values in Table 1 are suitable for smooth water service, but cases might occur in which a finer modelled vessel would show a financial gain over the year's trading, and this has been demonstrated in the case of two similar vessels recently buillt. vessel "A" has ordinary fullness as determined from Table 1. Vessel "B" has the same machinery as "A," but, because it has a finer coefficient, it was possible to increase the displacement and it was found that 500 tons could be added without increase of power or consumption at 9 knots speed, and at 10 knots a very slight reduction in power was indicated for the larger, finer vessel. The speeds were then forced up to 11 knots, and a distinct and clearly defined reduction in power was again apparent.

The general particulars of both vessels are given in Table 2 and the comparative powers and consumptions in Table 3. (on page 50)

In Mr. J. Semple's paper on "Some Experiments on Full Cargo Ship Models" read before the Institution

(*Continued on Page* 50)

Are Lake Cargo Vessels Too Full in Form?

The economic disadvantage of full form is discussed in the accompanying paper which was read before the Society of Naval Architects and Marine Engineers at their last annual meeting. An article by Edwin B. Sadtler, pointing out the disadvantages of too full a form in the case of a specific type of Great Lakes freighter, appeared on page 71 of the November number of MARINE REVIEW.

Admiral Taylor in his presidential address before the Society of Naval Architects and Marine Engineers said: "I venture to call the attention of our Great Lakes members to the fact that a large 15-knot overseas cargo vessel is nearly twice as speedy as a large 9-mile lake cargo carrier. We all know that on the lakes extraordinary and successful, and may I add, expensive efforts have been made to save the time spent in port by cargo carriers. Short as the lake trips are it may be that the time has come to save time under way."

A paper entitled "Maximum Block Coefficient and the Economic Disadvantage of Full Form" presented Nov. 11, 1926 at the meeting of the Society of Naval Architects and Marine Engineers at New York. The author, W. J. Lovett, is attached to the well known British shipbuilding firm, Workman, Clark & Co., Ltd.

TABLE I—BLOCK COEFFICIENTS

$\frac{V}{\sqrt{L}}$	LENGTH ÷ BREADTH $\frac{L}{B}$																					$\frac{V}{\sqrt{L}}$
	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	
.95	531	536	541	546	550	555	560	564	569	574	579	583	588	593	597	602	607	612	616	621	626	.95
.90	550	555	560	565	570	575	579	584	589	594	599	603	608	613	618	623	628	632	637	642	647	.90
.85	572	577	582	587	592	596	601	606	611	616	621	626	630	635	640	645	650	655	660	665	669	.85
.80	596	601	606	611	616	620	625	630	635	640	645	649	654	659	664	669	674	679	684	688	693	.80
.75	623	628	633	637	642	647	652	657	661	666	671	676	681	685	690	695	700	705	709	714	719	.75
.70	652	657	662	667	671	676	681	685	690	695	699	704	709	713	718	723	728	732	737	742	746	.70
.69	659	663	668	672	677	682	686	691	696	700	705	710	714	719	723	728	733	737	742	747	752	.69
.68	664	669	674	678	683	687	692	697	701	706	711	715	720	724	729	734	738	743	747	752	757	.68
.67	674	678	683	687	692	696	700	704	709	713	718	722	727	731	736	740	744	749	753	758	762	.67
.66	676	681	685	690	694	699	703	708	712	717	721	726	730	735	739	744	748	753	757	762	766	.66
.65	682	687	691	695	700	704	709	713	718	722	726	731	735	740	744	749	753	757	762	766	771	.65
.64	688	693	697	701	706	710	714	719	723	727	732	736	740	745	749	753	758	762	766	771	775	.64
.63	694	699	703	707	711	715	719	724	728	732	736	740	745	749	753	757	761	765	770	774	778	.63
.62	700	704	709	713	717	721	725	729	733	737	741	745	749	753	758	762	766	770	774	778	782	.62
.61	707	711	715	719	723	727	731	735	739	743	747	751	755	759	763	766	770	774	778	782	786	.61
.60	712	716	720	724	728	732	735	739	743	747	751	755	759	762	766	770	774	778	782	785	790	.60
.59	719	722	726	730	733	737	741	744	748	752	755	759	763	766	770	774	777	781	785	788	792	.59
.58	724	728	731	735	739	742	746	749	753	756	760	764	767	771	774	778	781	785	789	792	796	.58
.57	730	733	737	740	744	747	750	754	757	761	764	768	771	774	778	781	785	788	792	795	799	.57
.56	736	739	743	746	749	752	756	759	762	765	769	772	775	779	782	785	788	792	795	798	801	.56
.55	742	745	748	751	754	757	760	763	766	769	773	776	779	782	785	788	791	794	797	800	804	.55
.54	746	749	752	755	758	761	764	767	770	773	776	779	782	785	788	791	794	797	800	803	806	.54
.53	752	755	758	761	764	766	769	772	775	778	780	783	786	789	792	794	797	800	803	806	809	.53
.52	758	760	763	765	768	771	773	776	779	781	784	787	789	792	794	797	800	803	805	808	811	.52
.51	763	765	768	770	773	775	778	780	783	785	788	790	793	795	798	800	803	805	808	810	813	.51
.50	768	770	773	775	777	779	782	784	787	789	791	794	796	799	801	803	805	808	810	813	815	.50
.45	792	794	795	797	798	800	801	803	804	806	808	809	811	812	814	815	817	818	820	821	823	.45

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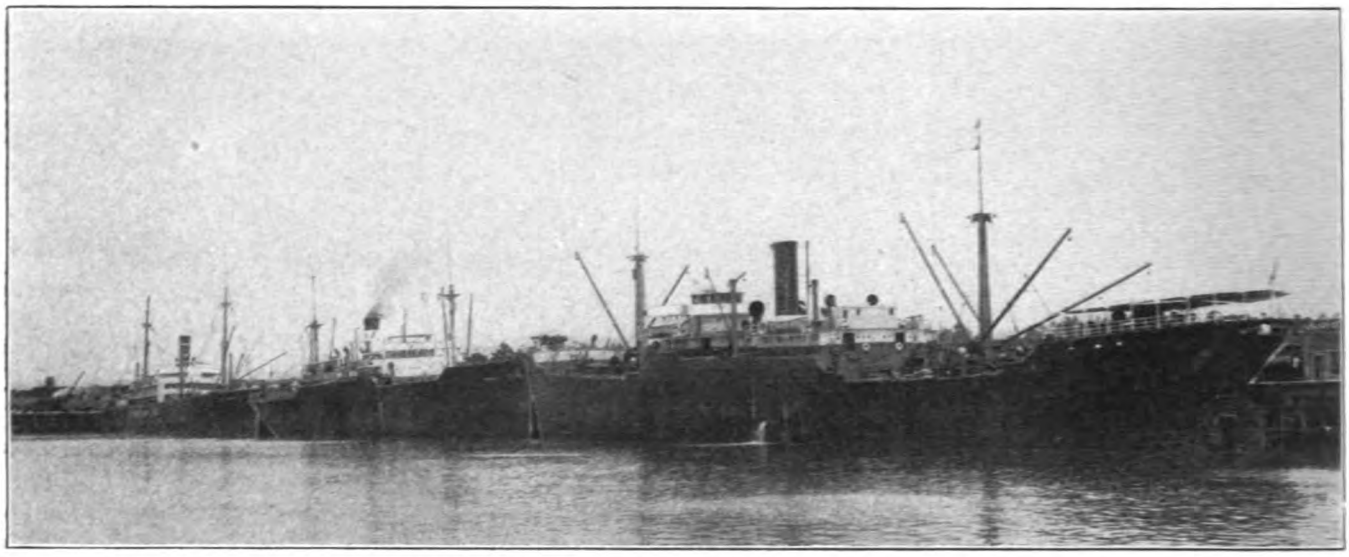
Dock Management Progress Section

How Successful Dock Operators Have Met Problems of Giving Best Service to Ships



A section of the public wharves at Houston, Texas

Houston Grows As Port Facilities Are Improved

BY CAPT. CHARLES CROTTY

IT MAY not be generally known that the South's most rapidly growing port is that of Houston, Texas, located 50 miles inland from the Gulf of Mexico on a tidal stream, or bayou, which has been deepened and widened by dredging until it now forms a ship canal over 30 feet in depth and a width of 250 feet on the bottom across Galveston bay and 150 feet on the bottom in the river and bayou sections, ending in a commodious harbor within the city limits of Houston.

The possibilities for the development of this port were realized by the late Commodore Charles Morgan, who founded the Morgan Steamship line and operated a few shallow draft side wheel steamers up the narrow, natural channel in the early seventies.

Through the co-operation of the local interests with the federal government, the present magnificent channel has been constructed at a cost of about $12,000,000 while the city of Houston and the navigation district have provided terminal facilities in the way of public wharves, storage sheds, grain elevator and a public belt railroad. The accompanying table shows the dimensions of the public-owned facilities which have been built at a cost of approximately $7,500,000.

Improve Dock System

The rapid growth of the Port of Houston demonstrates the vital importance of port development. General cargo of great variety handled over public and private wharves increased by 800 per cent over the year 1920 to a total of nearly 10,000,000 tons for 1925.

Progressive leadership realizing the necessity of ready access to the sea is steadily pursuing a policy of rational port development by means of public funds and by active encouragement of private enterprise.

The public belt railroad, owned by the city and navigation district, with some 40 miles of track and switches, serves all the public wharves and many of the private industries, providing a direct connection with the various trunk lines centering at Houston, a city whose slogan is "The port where seventeen railroads meet the sea." This public belt railroad is operated by the Port Terminal Railroad association, whose board of control consists of the chairman of the navigation district as its president, and a representative from each of the trunk line railroads connecting with the public belt road, and through this association impartial and dependable service is rendered to all lines; which has proved to be a most economical and efficient arrangement.

Private industries, such as oil refineries, Portland cement works, fertilizer works, flour and rice mills, chemical works, steel fabricating and

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Public Owned Wharves at Port Houston

Wharf	Length Ft.	Covered Berthing Capacity	Covered Area Sq. Ft.	Open Area Sq. Ft.	Railr oad Car Storage	Material Wharf	Material Shed
No. 1	647	2 Vessels	62,875	26,750	84	Creosoted Pile	Concrete
No. 2	522	1 Vessel	53,500	23,190	55	Concrete	Wood
No. 3	799	2 Vessels	15,140	9,349	23	Concrete	Wood
No. 4	777	2 Vessels	60,827	27,841	73	Concrete	Concrete
No. 5	104	1 Vessel	.....	4,514	8	Wood	
Nos. 7 and 8	800	2 Vessels	74,166	20,514	32	Wood	Wood
No. 10	600	1 Vessel	.....	118,000	109	Concrete	Open
No. 11	530	1 Vessel	66,660	29,160	65	Concrete	Concrete
No. 12	530	1 Vessel	65,909	29,260	60	Concrete	Concrete
No. 13	480	1 Vessel	62,176	32,500	57	Concrete	Concrete
No. 14	500	1 Vessel	.....	No. Deck		Concrete Pile Grain Berth	
Manchester Wharf	500	1 Vessel	86,836	17,164	30	Concrete	Steel
D stribution Warehouse		.....	201,203	.....	82		Concrete
Cotton Concentration Shed		.....	277,163	.....	150		Wood
Totals	6,789	16 Vessels	1,026,45	338,242	827		

assembling plants, cotton compresses and terminals have been located at various points along the channel, many of which have provided themselves with splendid wharves equipped to handle all kinds of cargo in the most efficient manner.

Cotton and oil are the principal commodities exported. During the year 1925 a total of 1,918,314 bales of cotton were shipped out of the port, while several million tons of crude and refined oils were imported and exported. Cotton seed cake and meal, rice, flour, sugar, coffee, bones, scrap, steel rails and structural steel, canned goods, shingles, lumber and various other articles were handled over the public and private wharves to the extent of 9,747,122 tons during 1925, as compared with 1,210,204 tons during the year 1920.

With the completion of the public grain elevator in June of this year, Houston entered the grain exporting trade and Sept. 1 had handled over two and a half million bushels of wheat. The elevator, designed by the John S. Metcalf Co., Chicago, and built by the Fegles Construction Co., Minneapolis, is considered the most modern plant of its type. It is equipped with the latest elevating machinery driven by individual electric motors and with an Ottumwa box car loader, which tilts the car of grain endways and sideways and unloads it in about eight or nine minutes, while delivery can be made to steamships at the rate of thirty to thirty-five thousand bushels per hour.

Service to and from the port is rendered by 52 steamship lines handling general cargo and passengers to all parts of the world. Fifteen tank lines handle the cargoes from the refineries to Gulf, North Altantic and European ports.

It will be noted that most of the public wharves are built of concrete with concrete transit sheds, and in several instances with shipside apron tracks.

Portable and fixed conveyors are provided on several of the wharves to facilitate the handling of cargo from shipside to the rear of the shed, and at wharf No. 4 to carry cargo to and from the transit shed above and

(*Continued on Page* 62)

FREIGHT IN TRANSIT AT THE PORT OF HOUSTON TO POINTS IN TEXAS, LOUISIANA, ARKANSAS, OKLAHOMA, KANSAS, NEW MEXICO, COLORADO AND ARIZONA

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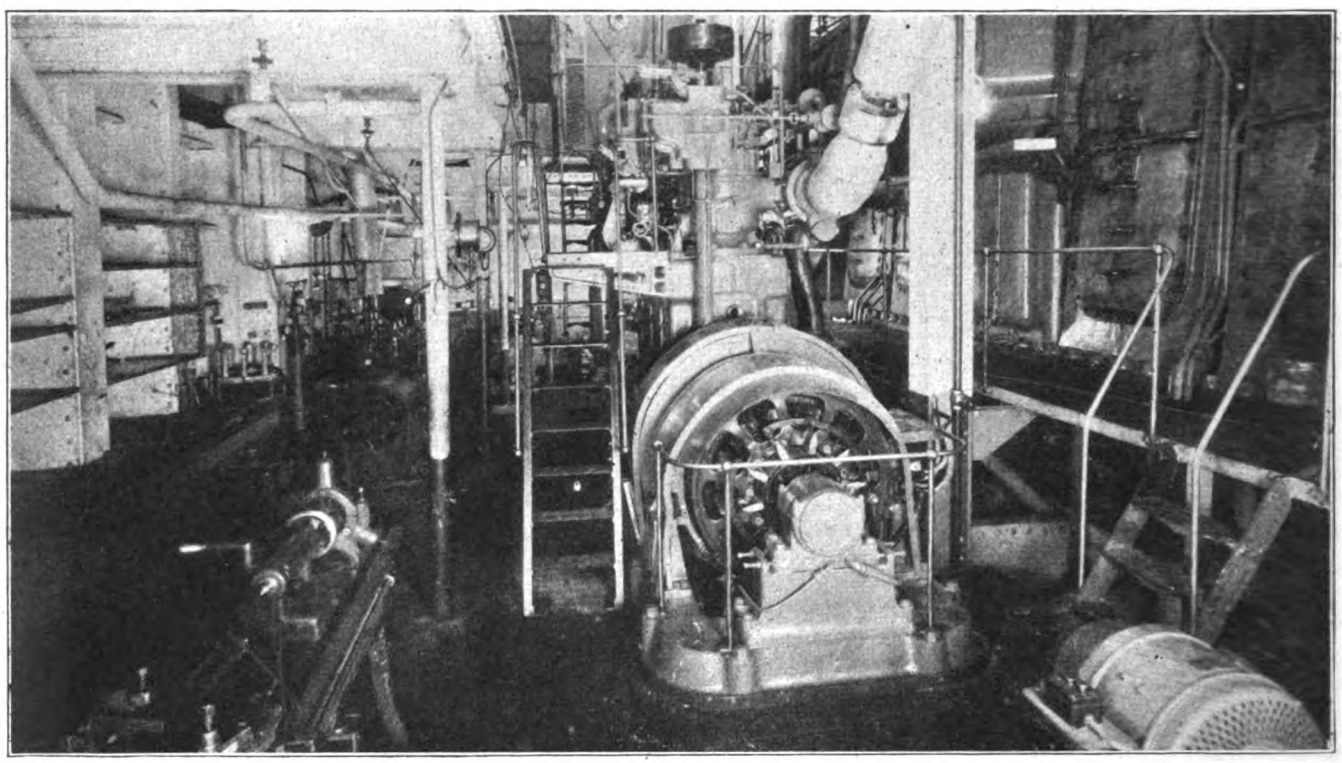
M. S. Tampa Sea Trials

(*Continued from Page* 17)

tion of the vessel was carried out by the Newport News Shipbuilding & Drydock Co. Newport News, Va. Delivery of the hull to the shipyard was made June 7, 1926 and the completed vessel was accepted by the Emergency Fleet Corp., Nov. 2, 1926.

Turning our attention for the moment to the engine room, the accompanying Table I of parallel columns gives the main and auxiliary machinery before and after conversion. The original boiler and engine rooms were completely gutted, the screen bulkhead separating these two spaces was removed and the combined space from the forward boiler room bulkhead (which is also the after bulkhead of No. 3 cargo hold) to the after engine room bulkhead and shaft alley recess (forward bulkhead of No. 4 cargo hold) is now the engine room of the converted vessel. The layout of the new engine room including the main engine, three duplicate auxiliary generating sets, a vertical cylindrical boiler for heating, pumps for a variety of services, lubricating oil purifiers, emergency lighting set, air starting tanks and other auxiliaries is shown in an accompanying illustration. It is evident from the appearance of order and roominess that the arrangement of the machinery was carefully planned and that the space has been used to the best advantage for ease in operation.

The main engine, a two-cycle, double-acting, four-cylinder, air-injection, diesel engine of 2900 brake-horsepower at 95 revolutions per minute designed and built by the Worthington Pump & Machinery Corp. was illustrated and described in the April 1926 number of MARINE REVIEW. After completion this engine was subjected to a 30 days' continuous test under load from Feb. 2 to March 2, 1926. An account of this test with complete results was published in the May 1926 number of MARINE REVIEW. In that test the average fuel consumption per brake horsepower per hour was 0.462 pounds, the average revolutions per minute was 96.4 and the average brake horsepower 2907. In the TAMPA the main engine is direct connected through a Kingsbury thrust and new line shafting to the propeller shaft. There is a new four-bladed sectional type bronze propeller designed under the supervision of Admiral Dyson by members of the technical section of the Emergency Fleet Corp.



M. S. TAMPA—Starboard side engine room looking aft—Marine engine to the right—One of the three 75-kilowatt diesel engine generating sets in the center—Emergency lighting set at left background—Oil pumps and purifier in center background—Machine shop at left foreground

All Auxiliaries Electric Driven

All of the auxiliaries below and above decks are electrical driven. Direct current at 240 volts is supplied by three 75-kilowatt generators each driven by a three-cylinder two-cycle solid-injection 115 brake horsepower Worthington diesel engine direct connected. The auxiliaries, their capacity and size are listed in accompanying Table 2.

This vessel has been completely modernized not only in propulsive machinery and engine room auxiliaries but also in all other equipment for her operation, loading and navigation. The original windlass was retained and rebuilt for electric motor drive, with a 45-horsepower Westinghouse motor and control panel and Cutler Hammer shoe brake. Nothing could be simpler or more compact than the steering gear. A 25-horsepower Westinghouse motor substituted for the original steam engine operates the screw through an enclosed worm and gear. The steering gear is operated from the bridge by a special gyro pilot and dual electric steering system developed by the Sperry Gyroscope Co. This equipment provides three methods of steering and a change from one to the other can be made by moving a lever mounted on the side of the steering stand to the positions "Gyro," "Wheel," and "Controller" according to the method it is desired to use. In the "Gyro" position the ship is steered automatically to the course set. In the "Wheel" position the ship is under control of the helmsman in the ordinary manner. In the "Controller" position the method is similar to that used in the navy, known as the non-follow-up and the electrical circuit is independent of those used

(*Continued on Page* 66)

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Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	486	1,954,853	542	2,301,465
September	492	2,087,694	543	2,270,398
August	491	2,034,147	507	2,075,643
July	493	1,943,133	546	2,251,396
June	542	2,337,678	563	2,279,208
May	448	1,856,777	538	2,126,788
April	483	1,967,964	538	2,248,081
March	523	2,090,347	511	2,033,938
February	404	1,591,273	454	1,826,886
January, 1926	407	1,671,761	463	1,883,094

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	145	370,112	128	329,420
September	107	234,144	82	196,434
August	109	248,435	81	170,661
July	92	191,680	69	128,381
June	104	229,681	56	109,561
May	97	215,829	69	151,287
April	80	185,401	61	135,919
March	107	264,754	72	158,858
February	78	184,715	52	113,763
January, 1926	76	206,081	52	136,040

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	109	300,921	58	171,983
September	105	308,189	83	246,136
August	128	321,377	96	206,879
July	152	336,135	108	274,513
June	164	370,526	109	262,468
May	134	277,009	111	261,878
April	101	285,245	77	210,542
March	117	356,432	62	173,217
February	92	263,475	42	136,613
January, 1926	97	287,335	55	156,167

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	20	48,468	23	52,900
September	24	43,783	19	35,828
August	23	47,089	26	45,669
July	27	47,885	26	47,569
June	29	44,390	29	46,942
May	19	49,894	17	47,016
April	23	48,836	32	73,947
March	34	97,413	31	88,462
January, 1926	26	78,508	27	81,917

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	7	23,091	8	29,815
September	5	20,651	5	22,324
August	6	20,764	3	12,299
July	7	29,207	5	18,641
June	5	17,954	3	8,355
May	7	25,057	6	20,806
April	8	28,449	5	23,480
March	15	47,557	8	34,025
February	8	29,622	7	30,033
January, 1926	5	20,355	6	24,221

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	41	151,013	59	217,745
September	33	126,772	56	201,152
August	40	150,609	46	167,419
July	24	93,977	33	127,270
June	22	77,850	45	156,103
May	35	128,351	43	152,890
April	17	66,789	29	107,892
March	21	85,073	38	134,432
February	23	81,440	33	114,147
January, 1926	22	84,722	26	97,068

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	271	791,999	261	783,263
September	230	678,127	224	670,465
August	228	672,453	221	639,677
July	211	644,261	202	603,648
June	138	402,230	132	371,781
May	120	369,729	121	355,443
April	107	330,401	110	326,649
March	120	382,983	119	362,256
February	102	304,714	99	288,640
January, 1926	97	302,341	88	264,249

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	252	683,297	307	850,828
September	252	705,604	281	766,503
August	188	545,861	255	733,837
July	267	727,874	309	854,305
June	78	215,803	171	502,701
May	40	107,858	140	368,515
April	21	45,875	126	305,549
March	22	40,160	140	395,033
February	20	48,377	108	298,756
January, 1926	26	69,958	96	256,019

Savannah

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1926	43	102,126	41	99,244
February	40	97,908	46	121,792
January	38	103,029	38	106,472
December	37	101,726	35	91,141
November	37	112,158	38	117,064
October	45	125,766	47	126,452
September	50	137,030	39	103,408
August	34	77,027	39	87,455
July	38	97,332	34	91,981
June, 1925	26	60,788	27	60,924

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	78	92,987	79	96,718
September	81	91,321	80	88,844
August	84	98,702	87	99,362
July	78	86,124	77	86,323
June	94	110,100	94	108,581
May	114	126,089	109	120,597
April	88	101,331	88	99,227
March	102	117,292	90	114,917
February	70	85,607	69	88,229
January, 1926	80	110,684	81	110,084

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	98	213,430	99	211,785
September	84	179,225	75	165,838
August	89	166,164	81	158,197
July	86	163,642	84	159,256
June	89	168,610	89	163,318
May	99	188,795	95	191,442
April	109	205,035	98	178,025
March	125	228,481	115	221,022
February	100	153,884	92	188,057
January, 1926	109	212,005	78	150,384

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	56	236,587	55	230,412
September	54	219,623	58	233,320
August	53	229,111	48	206,042
July	35	146,670	31	126,407
June	39	165,989	42	181,090
May	39	159,755	44	163,718
April	51	215,641	47	191,161
March	38	166,536	45	184,067
February	42	168,308	45	182,920
January, 1926	45	182,889	50	204,058

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	236	673,606	250	721,608
September	226	620,095	240	666,778
August	275	764,464	256	721,654
July	263	716,066	270	739,005
June	255	658,385	221	665,960
May	287	753,621	284	772,138
April	248	626,277	296	694,673
March	295	754,863	300	751,054
February	255	717,048	250	691,747
January, 1926	241	659,776	243	652,209

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
October, 1926	11	32,323	15	40,127
September	22	65,872	34	98,447
August	24	64,334	20	51,505
July	13	37,020	13	33,908
June	8	27,095	10	30,601
May	5	18,321	10	20,514
April	11	37,459	12	27,166
March	18	64,432	20	49,897
February	10	35,629	10	21,945
Janunary, 1926	8	27,610	13	27,237

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
September, 1926	52	139,219	127	368,302
August	55	129,477	131	389,432
July	60	164,241	116	352,290
June	53	119,497	72	185,444
May	28	65,578	61	180,449
April	37	87,356	82	216,312
March	42	87,056	72	208,346
February	39	89,426	71	208,388
January	36	92,194	75	235,699
December, 1925	38	83,590	97	300,872

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	187	448,038	155	421,807
September	151	406,314	211	386,739
August	143	458,240	151	399,349
July	127	460,296	103	352,367
June	123	349,986	88	344,187
May	133	376,720	112	351,123
April	149	434,866	130	370,158
March	139	371,793	128	305,105
February	119	363,875	111	306,161
January	130	381,785	115	335,041
December, 1925	149	392,707	109	310,852

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	145	532,024	153	575,263
September	170	568,323	156	561,513
August	169	580,310	111	466,346
July	160	523,527	102	495,849
June	142	561,774	100	419,036
May	154	605,068	116	428,814
April	155	583,821	167	602,680
March	144	571,040	135	511,010
February	133	506,778	134	506,317
January, 1926	154	544,882	139	528,315

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1926	19	53,558	23	71,270
September	15	43,874	22	72,960
August	19	63,639	24	71,545
July	25	79,464	32	98,637
June	22	70,743	30	97,056
May	20	60,276	36	95,754
April	32	95,592	38	108,923
March	28	87,715	37	101,830
February	21	65,930	32	70,814
January, 1926	23	75,232	32	108,118

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Personal Sketches of Marine Men

Elmer Ambrose Sperry, Chairman, Sperry Gyroscope Co.

By E. C. Kreutzberg

OVER 400 patents have been allowed him for inventions of diversified character rendering invaluable service today in many different fields.

IN RECOGNITION of the importance and scope of his inventions he has been awarded the highest honor within the gift of the engineering profession.

NO HOURS are too long and no personal sacrifice is too great when he visualizes a problem which he seeks to solve, but with it all he is intensely human in friendship and loyalty to home and country.

THE ability to invent is something that cannot be acquired, according to Elmer Ambrose Sperry. He believes that a man either is born or is not born an inventor. He remembers his childhood, and how his keenness for wheels proved quite a nuisance to other members of the household. He would pick up wheels here and there and lug them home to assemble them into all kinds of mechanisms, at times making the parental abode resemble a junk shop.

He was interested in the various activities of the boys in his home town but in a different way. For instance, when it came to baseball, young Sperry was more interested in the implements used in the game than in the game itself. He wormed his way into the good-will of a couple of machine shop owners and he would use their lathes for turning up bats. He would play with a bat for a couple of innings and then go back and try to turn up a better one. His interest primarily was in evolving something new or something better than previously had existed. If it was not baseball bats it was something else.

The instinct which thus was expended in his boyhood on such things as baseball bats, has reached its fruition in the years since in a catalog of discoveries which has earned for Mr. Sperry recognition as one of the greatest of living inventors. More than 400 patents have been allowed to him for inventions of diversified character which are rendering invaluable service today in many different fields. It is because of the importance and scope of his inventions that the greatest honor within the gift of the engineering profession in the United States recently has been bestowed upon him. This is the John Fritz gold medal, which formally will be presented to Mr. Sperry on Dec. 7.

Born at Cortland, N. Y., in 1860, the descendant of English settlers who came to this country in 1634, Mr. Sperry was educated at the state normal school at Cortland and at Cornell university where he spent a single year, 1879-80. In 1879 he made his first real invention, an arc light. In 1880, while still a youth of 20, he founded the Sperry Electric Co., Chicago, and manufactured arc lamps, dynamos, motors and other electrical appliances. It was in 1883 that he erected on Lake Michigan the highest electrical beacon in the world. This was about 350 feet high and was equipped with arc lights having a total of 40,000 candle power. As a result of entering a competition in 1888, Mr. Sperry produced the first electrical mining machinery. His inventions in this field cover a wide range. and machinery invented by Mr. Sperry continues to be used in mining operations.

About 30 years ago, Mr. Sperry became interested in the gyroscope and concluded that it could be utilized as a high precision compass. As a result, he produced his first successful gyro-compass which is used today as standard gunnery and navigating equipment in all navies. Further experiments with the gyroscope yielded the gyro-pilot for the automatic steering of ships. "Metal Mike" it was called by a skipper when it first made its appearance and the device since has became known by that name. With this instrument, the slightest departure from the true course of the ship is instantly and automatically corrected. "Metal Mike" has been installed on practically all of the world's great liners. Mr. Sperry also applied the gyroscope toward the stabilization of ships. Four years of experience with a 16,000-ton vessel equipped with one of Mr. Sperry's gyroscopes,

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You are *Always* Safe in Buying Columbian

With such a guarantee and backing as the Columbian Rope Company gives its product, Columbian *Tape-Marked* Pure Manila Rope, you cannot make a mistake in buying it.

No other rope on the market is quite as safe a buy as Columbian, for no other rope has the tangible guarantee that you get with every Columbian Line. Think of it—a signed guarantee, right in the rope! It is easily found printed on the red, white and blue *Tape-Marker*, which extends in one strand, throughout the entire length of every *Tape-Marked* Rope, and reads;

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Whether it is intended for rope slings, making fast, or work on board the ship, you can't buy a better all-around good rope than Columbian *Tape-Marked* Pure Manila Rope. Specify it on your next rope requisition.

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for instance, shows that a roll of 20 degrees on a side when the gyro is not functioning, instantly is cut down to 2 degrees or less on setting the gyroscope in motion.

In late years, Mr. Sperry has devoted further attention to arc lights and about 11 years ago perfected his high intensity arc searchlight. This has 700 per cent more brightness than any previous artificial light. Mr. Sperry's new light now is the standard for the principal armies and navies of the world and has many other applications. The use of this light has revolutionized the production of motion pictures and also is utilized for projecting motion pictures on the screen.

Some 30 years ago, Mr. Sperry produced his first compound internal combustion engine and from time to time has made substantial contributions toward the development of such engines. His greatest achievement in this field is his compound diesel engine which consumes fuel oil of the lowest grade. It is an exceedingly light engine and gives promise of becoming available for aircraft. This application will remove the fire hazard, which, with more volatile fuels comprises the greatest danger to aviators.

Numerous highly scientific inventions have been made by Mr. Sperry for the United States government. These include gun fire control apparatus, sighting devices, stabilized cameras, and electrically sustained gyroscopes for torpedoes. He is an active member of the Naval Consulting board. It is considered that his contributions to American and foreign governments during the late war were of inestimable value.

Mr. Sperry is a charter member and founder of the American Institute of Electrical Engineers, the American Electrochemical society, and the National Electric Light association, a fellow of the National Academy of Sciences, a member of the Alpha Chapter of the Society of the Sigma Xi, a member of the American Society of Mechanical Engineers, American Chemical society, Society of Naval Architects and Marine Engineers, Society of Automotive Engineers, American Physical society, New York Electrical society, American Petroleum institute, Edison Pioneers and Japan society. He is also an honorary member of two Japanese engineering societies: the Society of Mechanical Engineers and the Society of Naval Architects. His clubs are the Engineers', Army and Navy, Engineers' Golf and Country, Suffolk County Golf and Country, Hamilton club and the Garden City Golf club. He has been honored with the degrees of Doctor of Engineering by Stevens Institute of Technology, and Doctor of Science by Northwestern university.

Untiring energy has spurred on Mr. Sperry all through his career. No hours are too long and no personal sacrifice too great when he visualizes a problem which he seeks to solve. As in his boyhood days, when he preferred to turn out better baseball bats to actually playing baseball, he consistently and primarily has been an inventor. It is a fact known to all his friends that he gained fortunes on some of his inventions only to expend them in achieving others, and that Mr. Sperry has known adversity. Despite the intensity that characterizes Mr. Sperry in his research work, he is an absolutely human man. He is warm-hearted and loyal and, despite his labors, has had time to form many fine friendships. He is especially enthusiastic in supporting movements that have to do with the encouragement of aviation in this country.

For many years a resident of Brooklyn, Mr. Sperry is known for his hearty participation in movements affecting the welfare of the community. He is a member of the general board of the Young Men's Christian association and is especially enthusiastic over the work that is being done by that body in China. Recently he built a fine residence at Bellport, Long Island, where he now resides. His principal recreation is golf.

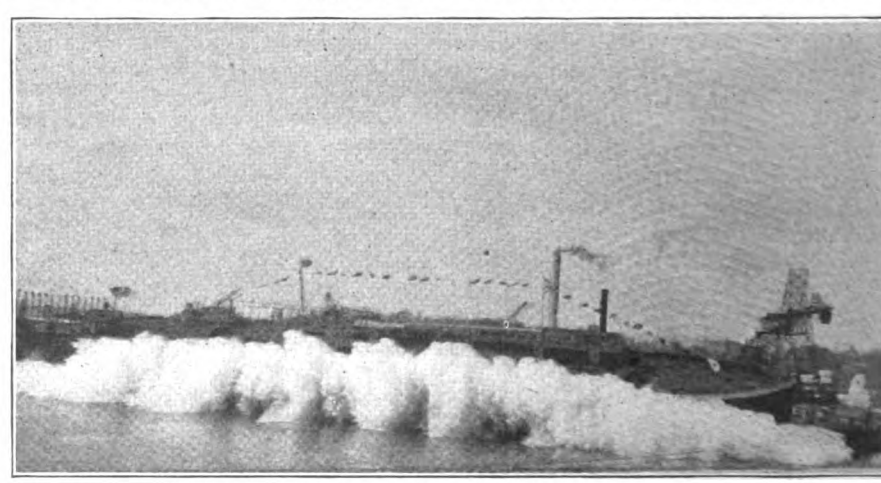
Mr. Sperry was decorated by the late Czar Nicholas of Russia for navigational equipment. In 1922 he received the Order of the Rising Sun from the Emperor of Japan. He has received various awards in addition to those mentioned. At the World Columbian exposition in 1894, his mining machines received honorable mention. The Franklin Institute medal was awarded to him in 1914. The grand prize, for the gyro compass and gyroscope, was awarded to him at the San Francisco exposition in 1915. He has the American Museum of Safety medal.

Launch Large Carferry at Manitowoc

THE large steel carferry GRAND RAPIDS, building for the Grand Trunk railway system, Canada, was launched at the yards of the Manitowoc Shipbuilding Corp., at Manitowoc, Wis., on Oct. 23, Miss Merlyn F. Bowker, daughter of C. G. Bowker, general manager of Grand Trunk system, acted as sponsor.

The steamer GRAND RAPIDS is designed to transport railway cars across Lake Michigan and represents the latest type of vessel for this class of service. The construction, machinery and equipment are of the highest quality and workmanship throughout and when completed, the boat will be placed in service between the ports of Milwaukee, Wis., and Grand Haven, Mich. The principal dimensions of the vessel are; length over all, 360 feet, length between perpendiculars, 348 feet; breadth molded, 56 feet; depth molded, 21 feet 6 inches.

The vessel is a twin screw steamer of steel construction throughout, except the inside cabin finish, and it has a specially constructed heavily reinforced bow for ice service.



THE LARGE STEEL CARFERRY GRAND RAPIDS LAUNCHED AT MANITOWOC OCT. 23, 1926—BUILDING FOR GRAND TRUNK RAILWAY FOR SERVICE BETWEEN MILWAUKEE AND GRAND HAVEN, MICH.

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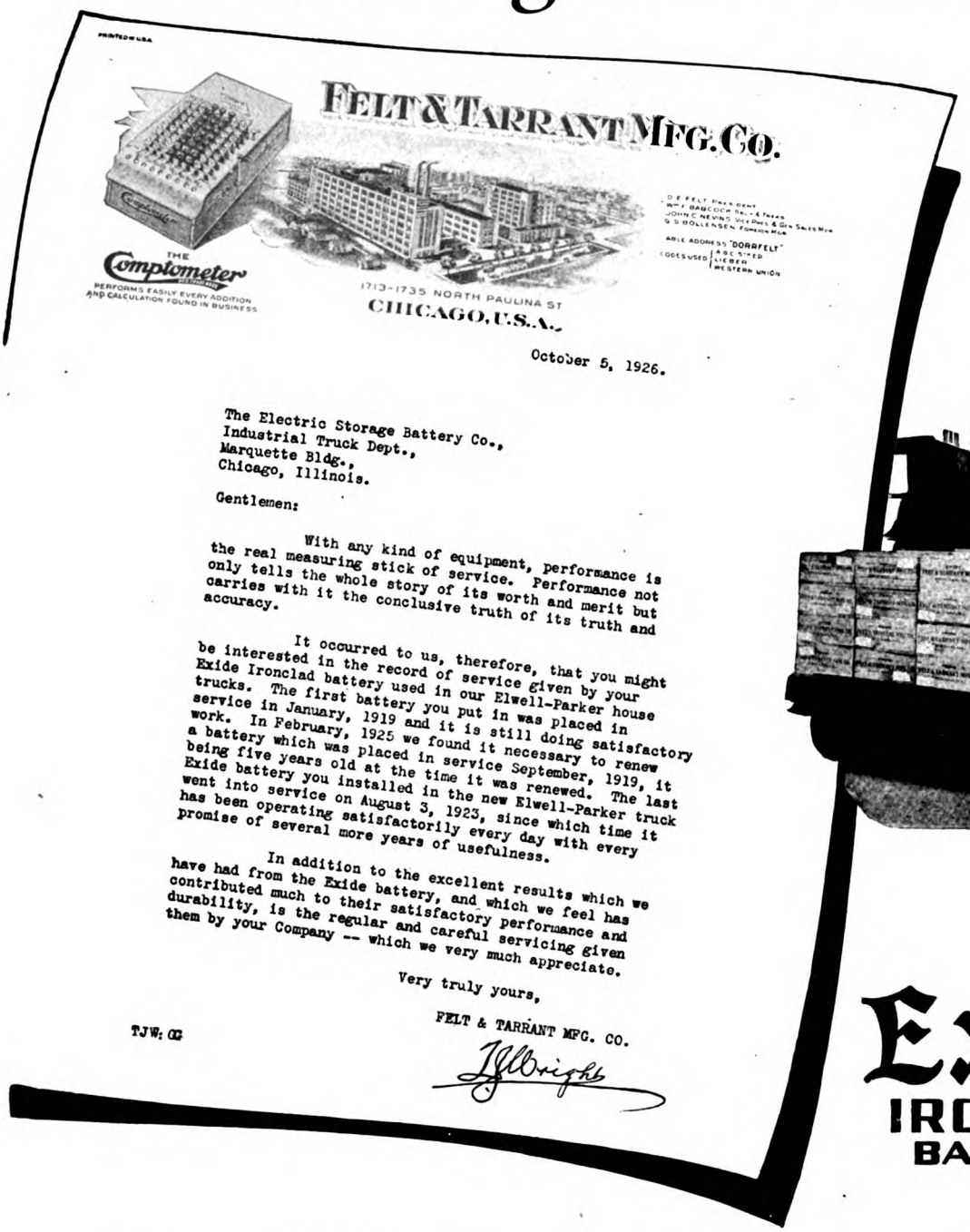
"Performance is the real measuring stick of service!"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October 5, 1926.
The Electric Storage Battery Co.,
Industrial Truck Dept.,
Marquette Bldg.,
Chicago, Illinois.
Gentlemen:
With any kind of equipment, performance is the real measuring stick of service. Performance not only tells the whole story of its worth and merit but carries with it the conclusive truth of its truth and accuracy.
It occurred to us, therefore, that you might be interested in the record of service given by your Exide Ironclad battery used in our Elwell-Parker house trucks. The first battery you put in was placed in service in January, 1919 and it is still doing satisfactory work. In February, 1925 we found it necessary to renew a battery which was placed in service September, 1919, it being five years old at the time it was renewed. The last Exide battery you installed in the new Elwell-Parker truck went into service on August 3, 1923, since which time it has been operating satisfactorily every day with every promise of several more years of usefulness.
In addition to the excellent results which we have had from the Exide battery, and which we feel has contributed much to their satisfactory performance and durability, is the regular and careful servicing given them by your Company -- which we very much appreciate.
Very truly yours,
FELT & TARRANT MFG. CO.
TJW: GC

Exide
IRONCLAD
BATTERIES

The performance of Exide-Ironclad Batteries receives another striking tribute

IT is impressive when a prominent electric industrial truck user speaks in such glowing terms of the performance of Exide-Ironclad Batteries. Yet the Felt & Tarrant Mfg. Co. is only one of the hundreds of firms that have discovered what the dependability and long life of Exide-Ironclad Batteries can do to lower material-handling costs.

It will pay you to know all about this remarkably dependable battery. Write now for a copy of our booklet, "Facts for consideration in selecting a Storage Battery," form number 2865.

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There are two triple expansion main engines with cylinders of 20½ x 34 x 56 inches and 36-inch stroke, built by the Manitowoc Shipbuilding Corp. Boilers; four in number are of the scotch marine type, 14 feet 6 inches x 20 feet, also built by Manitowoc Shipbuilding Corp.

The steering engine, mooring windlasses, gypsy engines, storm apron and operating windlass, and steering stands, were also designed and built by the shipyard.

There are four tracks on the main deck which will accommodate 30 freight cars. Located on the spar deck are 12 staterooms, dining saloon and large observation room forward for accommodation of passengers, quarters and mess rooms for the crew, pantry, galley and storerooms.

The Manitowoc Shipbuilding Corp., in addition to being actively engaged in the design and construction of all types of steel passenger and freight vessels, diesel ships, dredges, tugs, lighters, scows and marine machinery, has built during the past few years two carferries of a similar size as the GRAND RAPIDS for the Pere Marquette railway, one for the Ann Arbor railroad and one for river service for the Wabash railroad, all of which are in operation and giving excellent service to their respective owners. As extensive reconditioning and repair work is constantly under way on carferries operating on the lakes in addition to new construction, it can be said that this yard is unusually well qualified to handle the design and construction of ships of this class.

The MADISON, a sister ship to the GRAND RAPIDS and for the same service, is now under construction for the same company and will be launched in the next few weeks.

The launch of the GRAND RAPIDS was a success in every way and in addition to the officers of the Grand Trunk system, was attended by a large body of men prominent in the official commercial shipping fields.

Shipbuilding Experience Helps Operator

J. F. Paige has had a varied and interesting technical and practical background of experience in designing, building, repairing and operating ships.

After six years as apprentice and journeyman on mechanical and marine engineering work, he spent five years at sea in the merchant marine, serving through all grades to and including chief engineer.

J. F. PAIGE

From 1903 to 1916 he was connected with the Fore River Shipbuilding Corp. and the Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass. While with this company Mr. Paige served as foreman, superintendent of machinery, assistant chief engineer and assistant general superintendent in charge of all classes of merchant and naval work. He was then sent by the company as official representative for two years in Japan and one and one-half years in Italy, in connection with important naval contracts.

In 1917 he went to the Port Arthur Shipbuilding Co., Port Arthur, Ont., as general manager in charge of all work in connection with the design, building, drydocking and repairing of varied types of passenger and freight vessels. Mr. Paige continued in this position until December 1919, when he was made operating manager of the Halifax Ship Yards, Ltd., Halifax, Canada, where he engaged in similar work including the building of several vessels of 10,000 tons deadweight.

In February 1924 he returned to the United States and was appointed manager of the operating department of the United States shipping board, Emergency Fleet Corp., at New Orleans. In this position he had full charge of operations and maintenance and repairs under the jurisdiction of the Fleet corporation in the gulf district. In August 1925 he was transferred to Washington as head of the revenue and expense section, and in November of that year he was appointed assistant to the vice president of operations.

Mr. Paige's connection with the Emergency Fleet Corp. terminated Sept. 1, 1926 when he resigned to accept a position with the Black Diamond Steamship Corp., New York, as operating manager. The Black Diamond Steamship Corp., acting as managing operator for the United States shipping board, operates a fleet of sixteen vessels on routes between Boston, New York, Hampton Roads, Philadelphia and Baltimore to Antwerp and Rotterdam.

He is a member of the Society of Naval Architects and Marine Engineers, the American Society of Mechanical Engineers and the American Society of Naval Engineers.

Thau Made Manager Marine Engineering

Walter E. Thau, formerly electrical engineer marine section of the general engineering department of the Westinghouse Electric & Mfg. Co., was recently promoted to the position of manager of marine engineering.

Mr. Thau was born in Cincinnati,

WALTER E. THAU

in 1887. He graduated from the University of Cincinnati, with the degree of bachelor of science in electrical engineering, and in 1911 he entered the apprenticeship course of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

In 1912 he entered the engineering department to take up the work of applying electrical equipment to main roll drives and auxiliaries in steel mills. He remained in that work

(*Continued on Page* 50)

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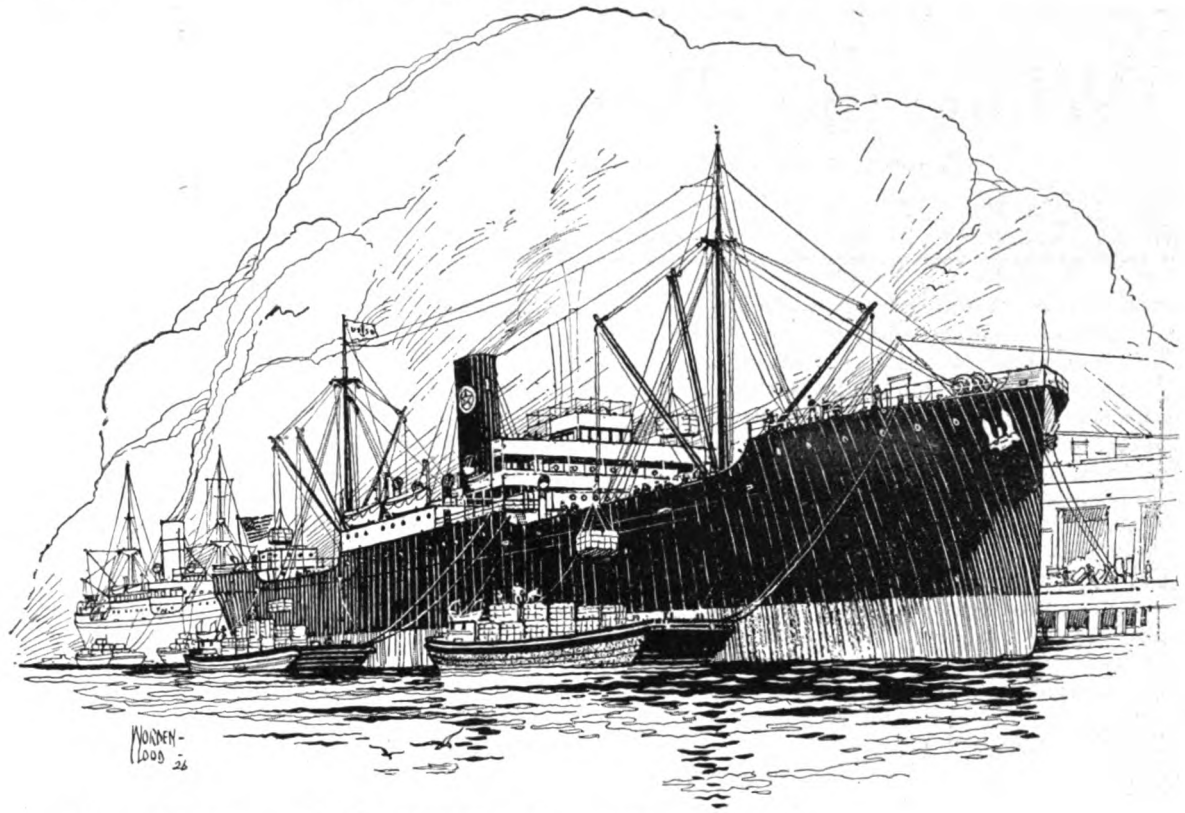

A World-Wide Freight Service By American Ships

SAILING under the American flag, and operated for the United States Shipping Board, great fleets of cargo vessels maintain speedy and efficient freight services from all the leading American ports to all parts of the world.

These services have proven highly beneficial to American manufacturers in opening up new and untapped markets for their merchandise and adding to the volume and variety of their foreign trade. Experienced shippers use them regularly and recommend them with enthusiasm.

Speedy passenger ships of the United States Lines are included, sailing from New York to principal European ports. In addition to carrying passengers, the United States Lines ships, led by the famous Leviathan, provide an exceptional express freight service.

For complete information on either freight or passenger service consult "Schedule of Sailings," a comprehensive publication issued by the Traffic Department, or write direct.

"Americans Ship On American Ships"

TRAFFIC DEPARTMENT

United States Shipping Board Emergency Fleet Corporation

WASHINGTON, D. C.

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What the British Are Doing

Short Surveys of Important Activities in Maritime Centers of Island Empire

THE output from the Clyde shipyards suffered severely during October as the resuult of lack of materials and fuel consequent upon the coal dispute. Only four vessels of an aggregate of less than 13,000 tons were built, making a total for the ten months of this year of 112 vessels of about 256,550 tons. With one exception the output for the year up to date is the lowest for more than 20 years. The largest of the four vessels built was a cargo steamer of 5000 tons. Orders booked during October included three turbine steamers to be built by William Denny & Bros., Dumbarton, for the Irish channel service of the London, Midland & Scottish railway; an oil-carrying vessel for British Tankers Ltd., and three cargo steamers for the Scindia Steam Navigation Co. Ltd., to be built by Lithgows, Port Glasgow; a cargo vessel to be built by Harland & Wolff, Ltd., Greenock, for the Moss Line, Liverpool; and a steamer to be built by Hiley & McLellan, Ltd., Polmadie.

* * *

A BOOM in British freights is taking place, reaching dimensions unparalleled since the war. The value for coal tonnage from the United States to the United Kingdom which had advanced from around 13s 6d in May to 28s a week ago has now reached 87s 6d. Corresponding advances are being conceded for grain from the two markets in most direct competition (Argentina and Montreal), and throughout the world rates are much above the average for 1925, in some cases twice to three times as high. The importation of large consignments of coal to Europe from America is mainly responsible for the pressing into service of boats that have laid idle for months.

* * *

A GROUP of businessmen headed by Sir James Connolly, formerly agent-general for Western Australia in London, Sir John Biles, of the well known firm of naval architects and engineers. Sir Eustace Deyncourt, until recently director of naval construction to the admiralty, and Sir Charles Parsons, head of the Parsons Marine Turbine Co. have submitted a shipping proposition to the Australian Commonwealth government. The promoters of the scheme also include several of the largest shipbuilders in Britain, backed by substantial financial and shipowning interests. The Commonwealth government has expressed approval of the scheme in princple. A capital of £11,000,000 is proposed, to build a fleet of 22-knot liners, which will revolutionize shipping facilities on the Indian and Australian runs. A regular fortnightly service is to be offered between Britain and Australia, calling between Bombay and Colombo both ways, half as fast again as the weekly service of mail ships now running to India and Australia. For the new service it is proposed to build a fleet of seven 24,000-ton liners, and it is intended that the ships shall be built and engined in Britain.

* * *

A CONTRACT for a floating dock at Singapore is to be placed on the Tyne with the firm of Swan Hunter and Wigham Richardson. Orders amounting to about £8,000,000 will mean a great boon to the present impoverished state of Tyneside The orders include five of the new Empire Australian liners and a new cruiser secured by Palmers Shipbuilding & Iron Co. of Jarrow.

Safety Council Elects Officers at Detroit

The fifteenth annual congress of the National Safety council held at Detroit, Oct. 25-29, attracted 5000 people from the more than twenty industrial divisions. The marine section was represented by a large delegation. Many constructive methods were suggested and plans for future activities were formulated. The following were chosen to hold office in the marine section during the ensuing year:

Chairman, Capt. W. P. Kain; first vice chairman, C. H. Potter; second vice president, Robert F. Hand; third vice chairman, Capt. R. C. Brennan; fourth vice chairman, F. P. Foisie; secretary, A. R. Bush; chairman bulletin committee, Capt. C. Bartlett; chairman program committee, R. E. Prouty; chairman membership committee, Arthur M. Tode; chairman stevedoring committee, F. H. Weeks; chairman research committee, Capt. Irving L. Evans; chairman publicity committee, Arthur M. Tode; chairman information and service committee, Milton D. McIntyre; engineering representative, W. E. Welch.

A list of the principal papers presented before the marine section at the annual meeting on Oct. 25-29 was published in the MARINE REVIEW for October on page 56.

Rivers & Harbors Congress

The twenty-second convention of the National Rivers and Harbors congress will be held in Washington, Dec. 8 and 9. Speakers will come to attend the convention from all parts of the country and addresses will deal with ocean ports, the Great Lakes, inland rivers and matters of general interest to waterways and water transportation. The following addresses are scheduled for presentation:

"Line Hall versus Terminal Charges," J. Spencer Smith; "The Great Lakes and their Traffic," R. J. Maclean; "Shall the I. C. C. Control Our Waterways and Highways?," J. N. Teal; "The Ports of Virginia," J. Gordon Bohannan; "Restoring Navigation On the Ouachita," H. J. Fernandes; "Federal Regulation of Water Lines," A. H. Ferguson; "Survey of the Tennessee and Its Tributaries," Lieut. Col. Harold C. Fiske, corps of engineers; "From Deficits to Dividends," Brig. Gen. T. Q. Ashburn; "A National Waterway Plan," Maj. Gen. Edgar Jadwin, chief of engineers; "Putting Barges on the Upper Mississippi," W. H. Morris; "Portland, the Port and Harbor," James H. Polhemus; "From Portland Harbor to the Sea," Maj. R. T. Coiner; United States district engineer; "The Water Caterpillar," Carl J. Baer.

The banquet of the Rivers and Harbors congress will be held on the evening of Dec. 8.

Made Vice President

S. W. Wakeman has been appointed vice president and general manager of the Bethlehem Shipbuilding Corp.

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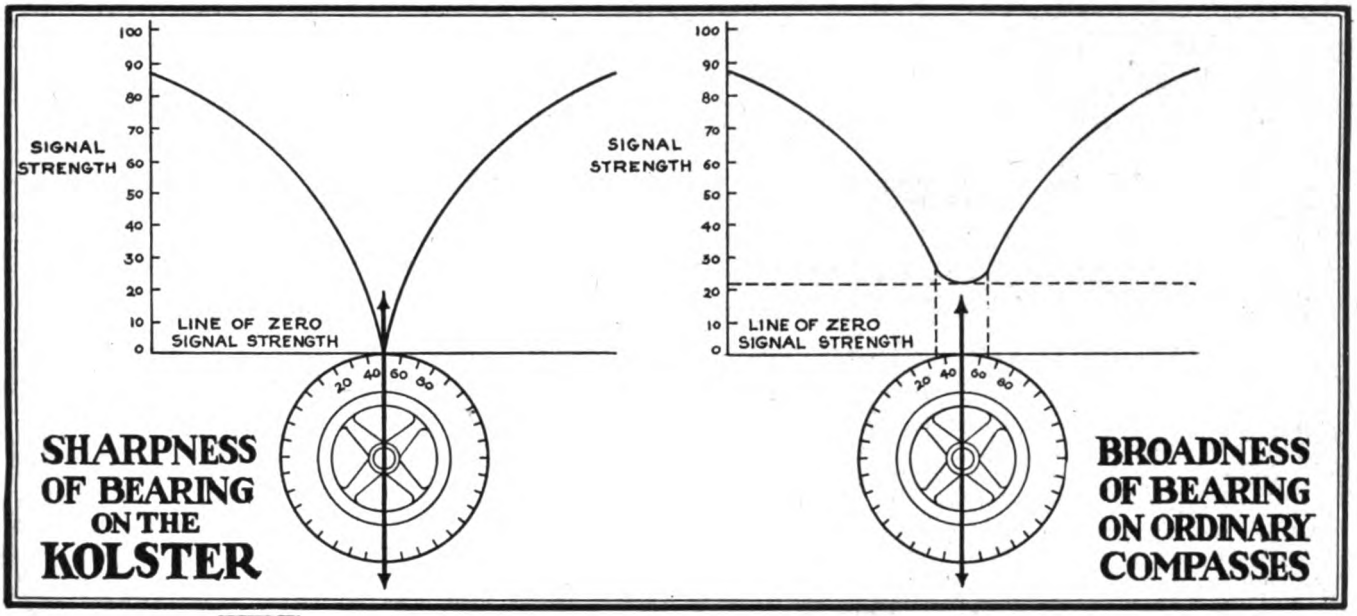
KOLSTER RADIO COMPASS



The Kolster is the original automatically compensated direct reading Radio Compass. Already in use on nearly two hundred ships, the Kolster needs no finer recommendation.

To seriously compare either a non-compensating compass or a broad-bearing compass with the Kolster is like comparing an old hand-oared galley ship to a modern liner.

The simple charts above depict one great difference---the wide variance in bearing between the sharp-bearing Kolster and a broad-bearing compass. One chart shows broadness which no user could willingly desire, and no amount of sales talk can justify.

The Kolster Compass is a scientific instrument, based first, last and always on *accuracy*. It is easily operated by the Navigator. The Kolster does not overlook the natural errors due to stacks, rigging and the like. Equipped with the Kolster Compensator, all of these natural errors are automatically nullified. Furthermore, through another exclusive Kolster improvement, sharpness of bearing becomes an accomplished fact.

The Kolster Compass is sensitive, selective and dependable. Its accuracy is guaranteed. Operates with single dial tuning control, has long lasting Edison storage battery for filament current, standard 6-volt vacuum tubes, occupies a minimum of space and is protected by the Kolster follow-up service.

When comparing compasses look for action that proves accuracy. Demand the sharp-bearing and compensating tests---and know the compass you select is scientifically correct

"Kolster Precision Defies Successful Imitation"

Full Patent Protection Guaranteed
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His headquarters will be at 25 Broadway, New York. Mr. Wakeman has been for nine years general manager of the company's Fore River yard at Quincy, Mass.

L. B. Sanderson Dies

One of New York's best known shipping men Lloyd Bowen Sanderson, general manager of the Royal Mail and Pacific Steam Navigation Co., 26 Broadway and senior partner in the firm of Sanderson and Son, died Oct. 24, at his home in New York in his sixty-first year.

Radio Compass School

A school for instruction in the operation and care of the radio compass was opened in Cleveland Nov. 3, in the Rockefeller building. All captains, mates and other members of ships' personnel in the Great Lakes district are invited to attend the demonstrations and instruction. The school is sponsored by the Federal Telegraph Co., San Francsiso.

Six Carfloats Ordered

American Brown Boveri Electric Corp. has been awarded a contract by the Reading company for six steel carfloats, two of these to be 250 feet long and the balance 200 feet. The molded beam of all these floats will be 34 feet 7 inches and the depth an even 9 feet. This contract is in addition to that recently received from the same company covering four single deck steel lighters which are now under construction. The new carfloats will be an important addition to the Reading company's present fleet assigned to Philadelphia harbor service. All will be delivered complete within less than six months time.

Ocean Freight Rates

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Quotations Corrected to Nov. 19, 1926 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH MARKED INCREASE TO SOME PORTS

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Liverpool	6s 6d-7s 7d	$0.50	$0.60	0.40	$0.40	$0.75+15%	$7.00T***	Fair
London	7s 0d‡	0.50	....	0.40	0.40+15%	0.75+15%	7.00T***	Fairly good
Oslo	$0.40	0.50	0.50	0 40	0.50	1.00	8 00T	Very good
Copenhagen	0.40	0.50	0.50	0.40	0.50	1.00	8.00T	Very good
Hamburg	0.30	0.55	0.50	0 35	0.50	1 00	10 00T	Very good
Bremen	0.30	0.45	0.50	0.38	0.50	0.90	10.00T	Very good
Rotterdam and Amsterdam	0.35	0.32½	0.60	0.40	0 45	0.80	9.50T	Good
Antwerp	0.30	0.32½	0.50	0.40	0.45	0.80	9.50T	Good
Havre	0.30-35	0.50	0.45	0.35	0.40	0.75	8.00T	Fair
Bordeaux	0.30	0.50	0.45	0.35	0.40	0.75	8.00T	Fair
Barcelona	....	12.00T	0.30	10.00	—12.00T—		8.00 to 15.00T	Very good
Lisbon	....	0.65	0.40	7.00T	—20.00T—		7.00T	Good
Marseilles	....	0.55	0.30	6.00	—20.00T—		5.50T	Fair
Genoa	0.35	14 25	0.50	9.00	—23.00T—		11.50T	Good
Naples	0.35	14.25	0.50	9.00	—23.00T—		11.50T	Good
Constantinople	0.35-50	17.00T	0.75	0.40	—20.00T—		9.00T	Very good
Alexandria	....	17.00T	0.75	0.40	—20.00T—		9.00T	Very good
Algiers	....	0.75	0.50	0.40	—20.00T—		10.00T	Very poor
Dakar	....	15.00	....	14.00T	—21.00T—		10.50T	Very good
Capetown	Open	18.00	....	13.00T	—20.00T—		11.00 to 18.00T	Very good
Buenos Aires	....	20.00T	....	....	—20.00T†		8.00T	Fair
**Rio de Janeiro	....	22.00T	....	8.00T	20.00 to 22.00T†		7.00 to 7.70T†	Fair
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Fair
Havana	0.22½*	0.50	....	0.25*	....	....	4.00	Good
Vera Cruz	....	0.30	0.35	0.25	0.52½	1.05	0.30 to 0.35	Good
Valparaiso	....	1.07	....	0.70	0.45	0.80	10.00T	Fair
San Francisco	....	0.35 to 0.70	....	0.50 to 1.10	....	....	0.25 to 0.80	Good
Sydney	....	18.00T	1.25	18.00T	18.00-24.00T		9.00-12.00T	Fair
Calcutta	....	....	0.75	10.00T	—16.00T—		10.00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Lauded. ††Heavy products limited in length. *Extra charge for wharfage. **Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion. ***Plus 15 per cent.

From North Pacific Ports to	Lumber Per m. f.
San Francisco	$4.50 to 5.00
South California	4.50 to 5.00
Hawaiian Islands	9.00 to 10.00
New Zealand	16.00 to 19.00
Sydney	12.00 to 14.00
Melbourne-Adelaide	13.00 to 14.50
Oriental Ports	10.00 to 11.00
Oriental Ports (logs)	14.00 to 16.00
Peru-Chile	12.50 to 14.00
South Africa	18.00 to 22.00
Cuba	15.00 to 17.00
United Kingdom	100s to 125s
United Kingdom (ties)	...
Baltimore-Boston range	$14.00 to 15.00
Florida Range	No rates
Buenos Aires	15.00 to 17.00

Flour and Wheat

U. K. and Continent (gross ton) ..... 47s 5d to 52s 6d
Oriental Ports (net tons) .. $4.25 to 5.00

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5¾c per barrel. Owing to the coal stoppage in Britain no outward freight rates or bunker prices for coal or pig iron are quoted.

General cargo rates to Havana change daily and are omitted for the time being.

After Nov. 1 rates to Lisbon, Marseilles and Algiers will go up 15%.

Rates to Calcutta are subject to change without notice. Cotton goes only to Bombay.

Principal Rates To and From United Kingdom

	s	d		s	d
Grain, River Plate to United Kingdom	40	0	Pig iron, United Kingdom to New York or Philadelphia	12	6
Coal, South Wales to Near East	—	-			
Coal, United Kingdom to Buenos Aires	—	-	Iron ore, Bilbao to Cardiff	5	10
Manganese Ore, Poti to Philadelphia	$3.70		Iron ore, Huelva to Phila. or Balto	11	6

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Dec. 18, 1925	5.60	1.70½	5.00c
Jan. 2	5.50@6.25	1.75@1.80	5.25
Mar. 18	5.60@5.80	1.80½	5.50
Apr. 22	5.25@5.60	1.80@1.81½	5.75
May 19	5.25@5.60	1.80½	5.88
June 18	5.50@5.60	1.80½	6.08
July 20	5.00@5.60	1.80½	6.08
Aug. 12	5.00@5.60	1.81½	6.10
Sept. 18	5.45@6.00	1.81½	6.05
Oct. 22	7.25@7.50	1.70½	5.86
Nov. 19, 1926	7.00@7.50	1.81½	5.87

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
Jan. 20, 1926	5.50@6.25	1.71@1.79	5.00@5.65c
Feb. 18	5.80	1.78@1.86½	5.14@5.50
Mar. 18	5.00@5.25	1.80@1.86½	5.40@5.65
Apr. 22	5.25	1.77@1.86½	5.90@5.93
May 19	5.25@5.70	1.82@1.86½	6.15@6.38
June 18	4.90@5.15	1.80@1.86½	6.15@6.43
July 20	5.10@5.50	1.74@1.81½	5.09@6.15
Aug. 12	5.00@5.25	1.69@1.74½	5.75@6.17
Sept. 18	5.00@5.35	1.74@1.74½	6.14½
Oct. 22	7.25@7.50	1.74@1.80½	5.66@5.88
Nov. 19, 1926	7.00@7.50	1.80½@1.81	5.43@5.88

Other Ports

Boston, coal, per ton $7.92
Boston, oil, f. a. s., per barrel $1.78
Hampton Roads, coal, per ton, f.o.b., piers $7.00
July 9 — Cardiff, coal, per ton ..... —s —d
London, coal, per ton ..... —s —d
Antwerp, coal, per ton ..... —s —d
Antwerp, Fuel oil, per ton 77s 6d
Antwerp, Diesel oil, per ton 97s 6d
British ports, Fuel oil 85s 0d
British ports, Diesel oil 100s 0d

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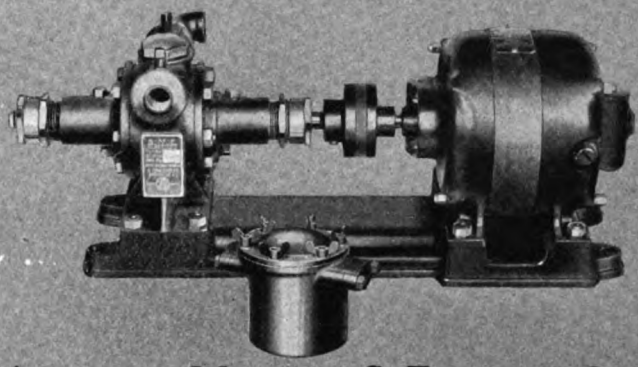

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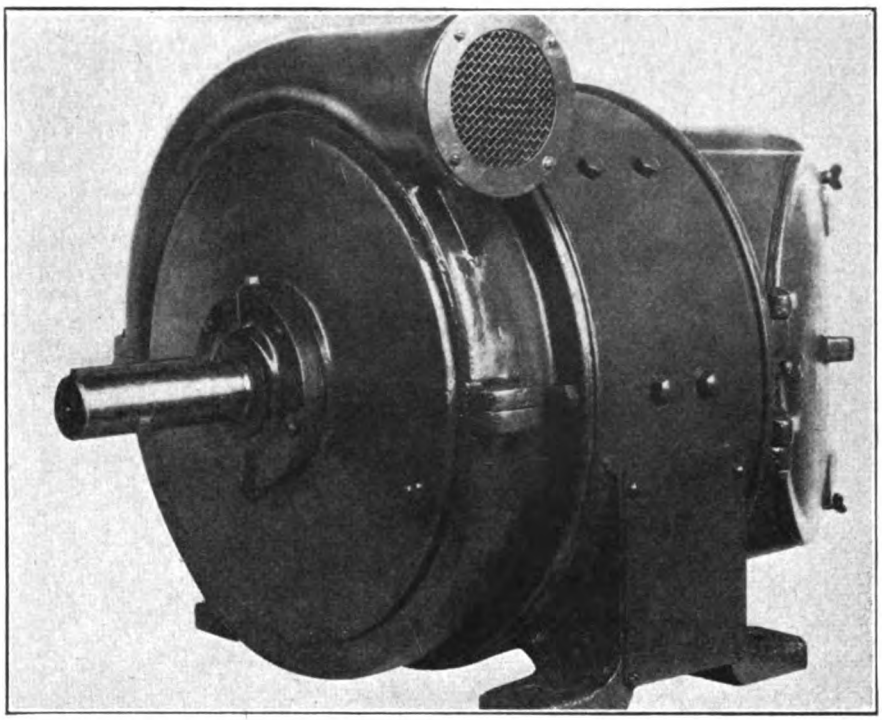
Electric Auxiliaries

(*Continued from Page* 19)

in engine room auxiliary electrification do not differ materially from an electrical point of view from those encountered in land practice. Practically all auxiliaries used on a ship are of a simple mechanical nature and do not involve any particular difficulties. The auxiliaries include such items as pumps, both centrifugal and plunger types, blowers, compressors, hydraulic steering gears, galley and machine shop appliances. The main differences in the mechanical structure of the motors for marine and land service lie in the protective features. The degree of protection required against moisture, splashing of water or oil and mechanical injury, is dependent upon the location of the apparatus in the ship and the specific duty and type of auxiliary to which the motor is attached.

The latest developments in motor construction for this type of service meet all the requirements in any degree desired. A view of a drip-proof motor of the fully protected type is shown in an accompanying illustration. The covers are of sheet metal construction, the top half solid and the bottom half perforated. These covers are easily detached for inspection of the interior of the motor. Another type of motor is the enclosed ventilated drip-proof type, as shown in an accompanying illustration. This type of motor is provided with an internal fan and cast-iron protecting covers which are furnished with handhole covers fitted with gaskets. Motors of this type differ in degree of refinement from the drip-proof fully protected type, but not necessarily in application. Due to the inclusion of a fan, however, and the internal ventilating characteristics, the motor may be somewhat smaller for the same duty. An involute on the pulley end allows for a pipe connection to be made, in case it is desired to draw the ventilating air from a source away from the motor.



30-HORSEPOWER SHUNT ENCLOSED VENTILATED MARINE TYPE MOTOR FOR UNDER-DECK AUXILIARIES

Controls for Underdeck Auxiliaries

The standard line of control equipment, for engine room auxiliaries, consists of the manually operated, heavy duty starting rheostats of the dial type, and also starters of the magnetic type. The application of either type of control is extended to practically all starting duty aboard a vessel, and preference of one type over the other is a matter of the degree of refinement desired by the shipowner, the extent to which he wishes to protect the equipment from the harm that might come from inexperienced operators handling the equipment, and also the degree to which smooth acceleration, free from mechanical shock, is desired on account of the nature of the equipment to which the motor is attached.

The magnetic type of control, for various reasons, is coming into rapid favor, as it allows for remote control as well as undervoltage release features, if desired. The master switch, which operates the magnetic control panels, may be mounted in any convenient location, that is, on deck, under deck or directly on the motor.

Shipbuilders Support Pepper Bill

A DEFINITE plan to aid in the building up of the American merchant marine was submitted to the United States shipping board on Nov. 23, by spokesmen for the shipbuilding industry. The occasion was the final hearing in the series of conferences which have been held throughout the country in accordance with the provisions of the Jones' resolution adopted by the senate requesting the shipping board to report comprehensive and concrete plans for building up and maintaining an adequate merchant marine for commerce and national security.

The proposal of the ship builders was in substance the bill offered in the last session by Senator Pepper of Pennsylvania. The shipbuilders want the tariff policy of the nation extended to American ships in foreign trade by rebating to the ship owner that portion of the initial cost of the vessel represented by the tariff element. By offsetting the difference in the American ship owner's initial outlay with all that this means in higher interest, despreciation and insurance charges, it is claimed that the most serious of the obstacles in maritime competition would be partially removed and compensated for.

Ships to come under the provision of the proposed law would have to be constructed according to plans and specifications agreed upon between the owners and the shipping board, with particular reference to their availability for use by the government in time of war, and these ships would have to exclusively engage in foreign trade.

H. G. Smith, vice president of the Bethlehem Shipbuilding Corp., one of the speakers before the committee emphasized the seriousness to the nation's safety of the depletion of the

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trained staff of technical and mechanical employes who are leaving the shipbuilding industry. These men he pointed out, once lost cannot be replaced except by years of training and experience. J. Harry Mull, president of William Cramp & Sons Ship & Engine Building Co. and also president of the Atlantic Coast Ship Builders association declared that the higher wage level is maintained by the tariff and that shipbuilders cannot import the component parts of the ship but must use such component parts as are constructed here at a high cost maintained by the tariff. William Francis Gibbs, also appeared before the committee and said "I believe that in this bill Senator Pepper has gone, and in a most practical way, to the root of the question of the American merchant marine problem. He has laid down in legislative form the fundamental principles on which this country is now operating. Ships cannot be built in the United States as cheaply as they can be built abroad. Practically everything that enters into the construction of a ship is affected by our tariff laws. These tariff laws were intended to protect American industry and shipbuilding is and should be a natural American industry. I believe the Pepper bill will go far toward putting any American ships built under its provision on a par with the cheaper ships of other nations."

Homer L. Ferguson pointed out that this is a bad time to be unprepared with the United States possessing so much of the wealth of the world. He referred to the high tariff wall which the nation has built up but called attention to the fact that the shipping interests have not been able to get behind it. In closing he pointed out that there cannot be any preparedness without ships and without shipping and that this has been recognized in the history of every great country the world has ever seen. Rear Admiral D. W. Taylor spoke of the need for new and modern vessels to replace our obsolete ships and he especially emphasized the advantages of diesel propulsion and that a great amount of the world's tonnage is now being fitted with this economical type of power. The development of the diesel engine has accellerated the obsolesence of vessels built during the war and which are usually referred to as first class.

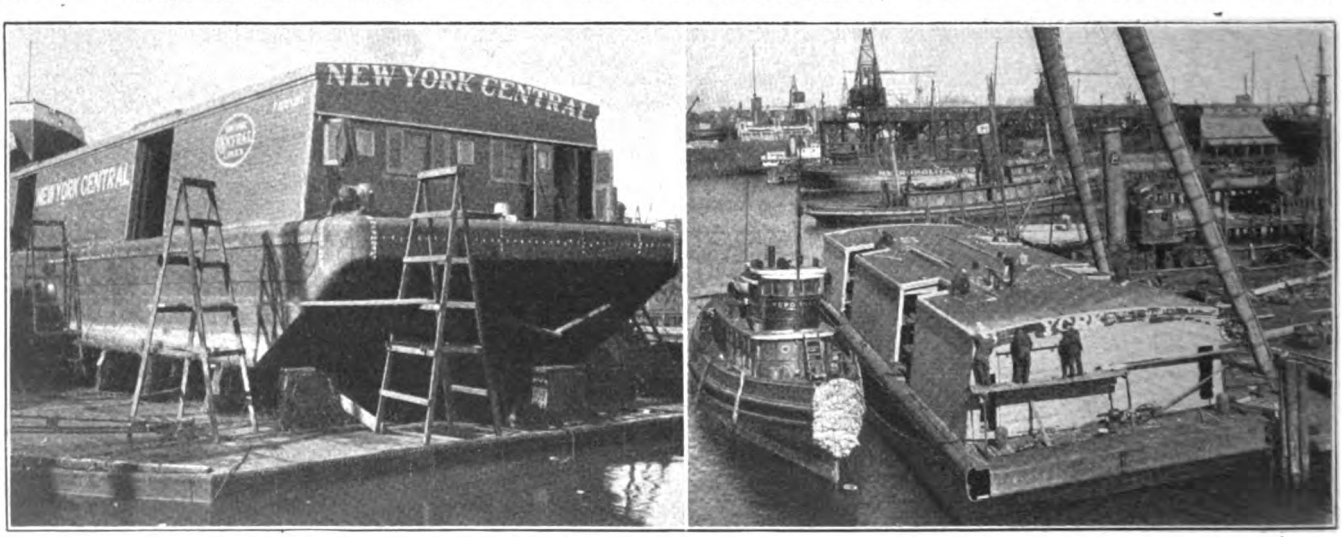
Three reasons were given by Clinton L. Bardo, vice president of the American Brown Boveri Electric Corp. why the shipbuilding industry cannot maintain itself on the present available business, 1. Curtailment of construction in private yards for the navy; 2. Curtailment of building for coastwise trade due to surplus of shipping board tonnage; 3. Inability to replace shrinkage of tonnage referred to because of higher cost of constructing ships here than abroad. James Swan, editor of the *Marine Engineering and Shipping Age* who has recently devoted much time to the study of shipbuilding costs abroad as compared with those in this country, said that the higher cost in this country is due directly to our protective tariff which induces a higher standard of wages and imposes greater expense for the material that goes to make up the component parts of the ship, but that this tariff does not offer the same compensating advantages to shipbuilding that it does to other industries. Serious consideration should be given these opinions.

Channel Steel Barges Are Economical

Thirty-five Completed or Under Construction

A YEAR ago the New York Central railroad replaced a portion of its wooden fleet of deck barges with Ellis channel steel barges for use in New York harbor. After a thorough tryout of these barges their generally satisfactory behavior and low maintenance cost caused the New York Central to place an additional order for 10 barges. Others have also recognized the advantages of this type of construction.

Shortly after the New York Central had placed their second order, the Raymond Concrete Pile Co., New York whose pile driving barges require greater strength for a given weight than any other type of floating craft, ordered eight barges to be shipped, knocked down, for work on Lake Maracaibo in South America. Like the New York Central orders, these barges for South America were built by the Atlantic Works, Inc., at Boston. These barges shipped in large sections required only about 15 per cent of the total amount of riveting to be done at place of final erection. The speed with which the Ellis channel type of construction can be put together is shown by the fact that from the date of the signing of the contract to the date when the first



COVERED BARGES OF THE ELLIS TYPE UNDER CONSTRUCTIO N AT THE ATLANTIC WORKS INC., FOR THE NEW YORK CENTRAL

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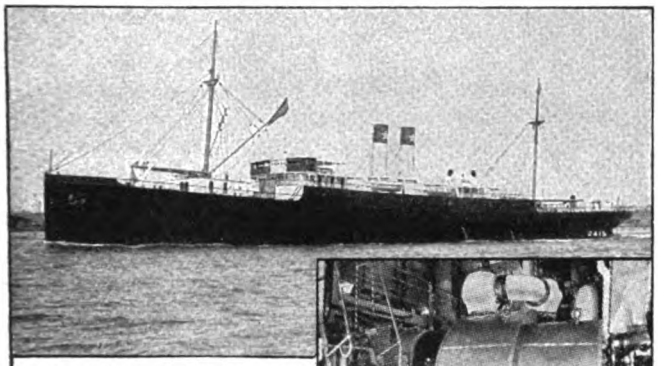
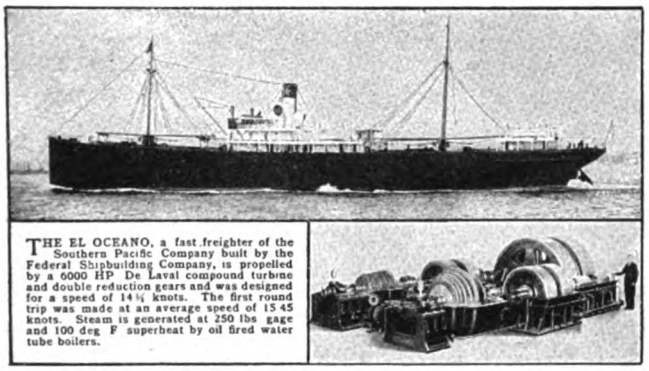
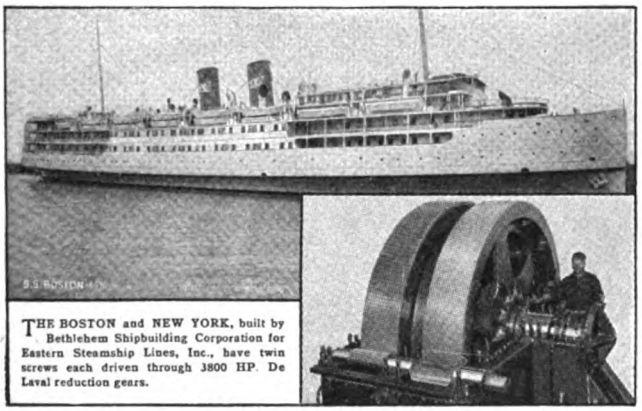


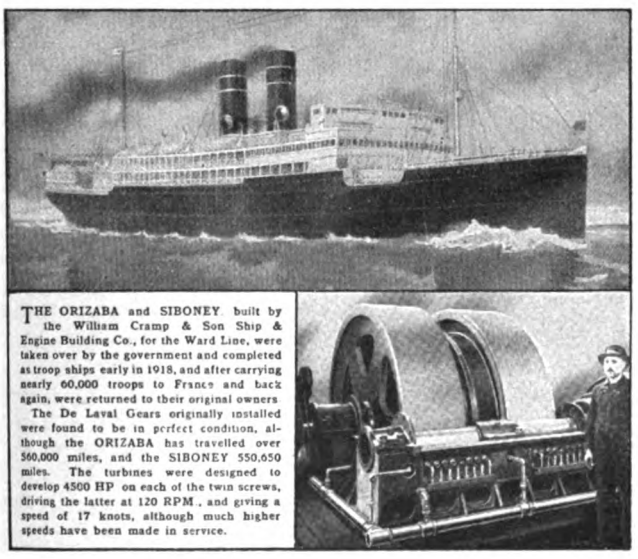
THE freighter, EL COSTON, owned by the Southern Pacific Co., measures 445 ft. over all, by 57 ft. beam and 37 ft. 6 in. depth. The De Laval marine impulse steam turbine and the De Laval double reduction gears which develop 7,100 shaft HP. drive the propeller at 85 RPM.



THE EL OCEANO, a fast freighter of the Southern Pacific Company built by the Federal Shipbuilding Company, is propelled by a 6000 HP De Laval compound turbine and double reduction gears and was designed for a speed of 14½ knots. The first round trip was made at an average speed of 15.45 knots. Steam is generated at 250 lbs gage and 100 deg F superheat by oil fired water tube boilers.

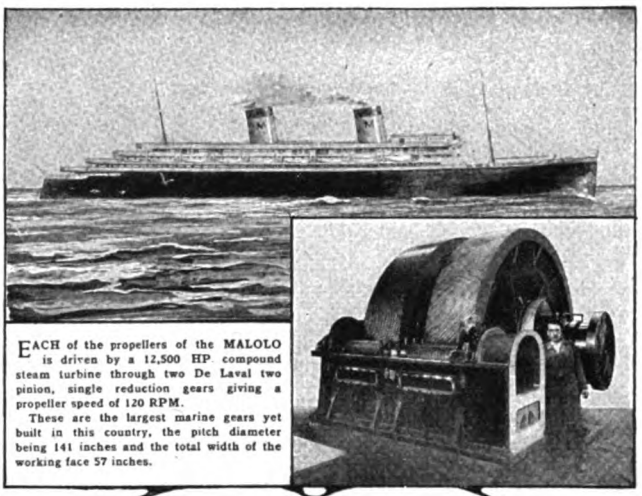


THE BOSTON and NEW YORK, built by Bethlehem Shipbuilding Corporation for Eastern Steamship Lines, Inc., have twin screws each driven through 3800 HP. De Laval reduction gears.



THE ORIZABA and SIBONEY, built by the William Cramp & Son Ship & Engine Building Co., for the Ward Line, were taken over by the government and completed as troop ships early in 1918, and after carrying nearly 60,000 troops to France and back again, were returned to their original owners.

The De Laval Gears originally installed were found to be in perfect condition, although the ORIZABA has travelled over 560,000 miles, and the SIBONEY 550,650 miles. The turbines were designed to develop 4500 HP on each of the twin screws, driving the latter at 120 RPM., and giving a speed of 17 knots, although much higher speeds have been made in service.



EACH of the propellers of the MALOLO is driven by a 12,500 HP compound steam turbine through two De Laval two pinion, single reduction gears giving a propeller speed of 120 RPM.

These are the largest marine gears yet built in this country, the pitch diameter being 141 inches and the total width of the working face 57 inches.

The Most Modern Ships Have

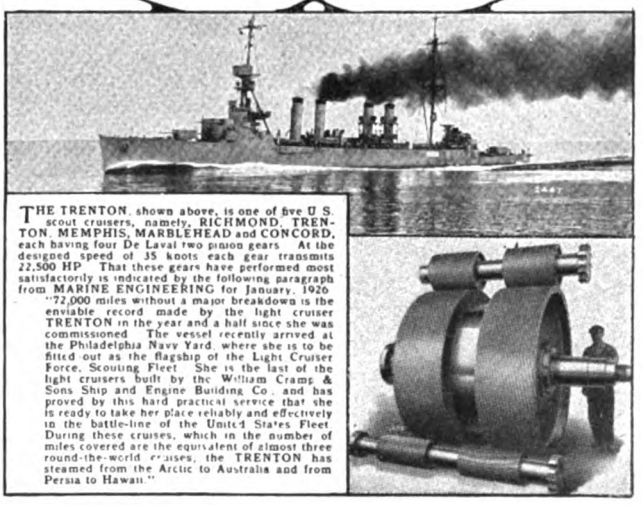
De Laval Turbines and Gears

The ships illustrated herewith are representative of over 3,000,000 HP. of De Lavel equipment in passenger and cargo ships, oil tankers, battle ships, destroyers and scout cruisers. They have proven themselves to be most economical and satisfactory in meeting the practical requirements of service.

Complete estimates on power plants for proposed vessels, including performance to be expected, supplied upon request.

De Laval Steam Turbine Co.

Trenton, New Jersey



THE TRENTON, shown above, is one of five U. S. scout cruisers, namely, RICHMOND, TRENTON, MEMPHIS, MARBLEHEAD and CONCORD, each having four De Laval two pinion gears. At the designed speed of 35 knots each gear transmits 22,500 HP. That these gears have performed most satisfactorily is indicated by the following paragraph from MARINE ENGINEERING for January, 1926:

"72,000 miles without a major breakdown is the enviable record made by the light cruiser TRENTON in the year and a half since she was commissioned. The vessel recently arrived at the Philadelphia Navy Yard, where she is to be fitted out as the flagship of the Light Cruiser Force, Scouting Fleet. She is the last of the light cruisers built by the William Cramp & Sons Ship and Engine Building Co., and has proved by this hard practical service that she is ready to take her place reliably and effectively in the battle-line of the United States Fleet. During these cruises, which in the number of miles covered are the equivalent of almost three round-the-world cruises, the TRENTON has steamed from the Arctic to Australia and from Persia to Hawaii."

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boat entered the Raymond company's service in Maracaibo was exactly 100 days; 15 days of which was consumed in transit.

Soon after the order for South America was shipped the Raymond company placed another order for a pile driving barge for use at New Orleans. This will be the first Ellis channel barge to be used on United States inland waters. It is now under construction by Jones & Laughlin Steel Co., Pittsburgh.

The New York Engineering Co. at Yonkers, N. Y., is also building channel barges of this type. At this yard, four barges for the Red D Steamship line and one for New York & Hastings Steamboat Co. are under construction. The Red D barges, for use in South America, are also to be shipped, knocked down and assembled at destination. The order for the New York & Hastings Steamboat Co. —a subsidiary of the Anaconda Copper Mining Co., is a 900-ton deck barge, the largest Ellis channel barge that has yet been built.

At Milwaukee, the first Ellis channel barge on the Great Lakes is being built for contracting work by Edward T. Gillen. The Wisconsin Bridge Co. is fabricating the steel. Pile driver and derrick are included in the equipment of the Gillen boat.

Inquiries are being received from the Pacific Coast and from foreign sources for Ellis channel barges. Among the many advantages that appeal to foreign owners is the small number of parts in the knocked down barge. The average in this respect results in a saving of about 75 per cent of parts to be shipped.

While the efforts of the Ellis channel organization have been devoted to the design of various types of dirrick, deck, covered and pile driving derrick barges, several self-propelled deck and hold barges have been designed. As there appears to be no reason why the advantages of the Ellis channel system in strength and low maintenance are not equally applicable to large vessels, tentative plans have been made for craft as large as 10,000 tons.

Order Six Diesel Electric Ferries

THE extensive construction program now being carried out by the Southern Pacific railroad is of great interest. Awards have recently been placed for the construction of six large diesel electric ferryboats with three San Francisco bay shipyards. These contracts are noteworthy, as the vessels will be the largest diesel electric ferryboats ever constructed, the diesel engine order is the largest yet placed at one time for commercial marine engines, and it is the railroad company's first step toward the dieselization of its extensive fleet of ferries on San Francisco bay.

There will be six vessels in all, each powered with four Nelseco 450 brake horsepower, type MI-22 engines. Three of the ferries will probably be used by the Southern Pacific company and will operate between San Francisco and Oakland, Calif., and three by the Northwestern Pacific railroad, which is under the joint management of the Southern Pacific and Santa Fe systems. These latter boats will operate from the foot of Market street, San Francisco, to Sausalito. All of the ferries will be strictly of the automobile type and will have a capacity of approximately 90 cars.

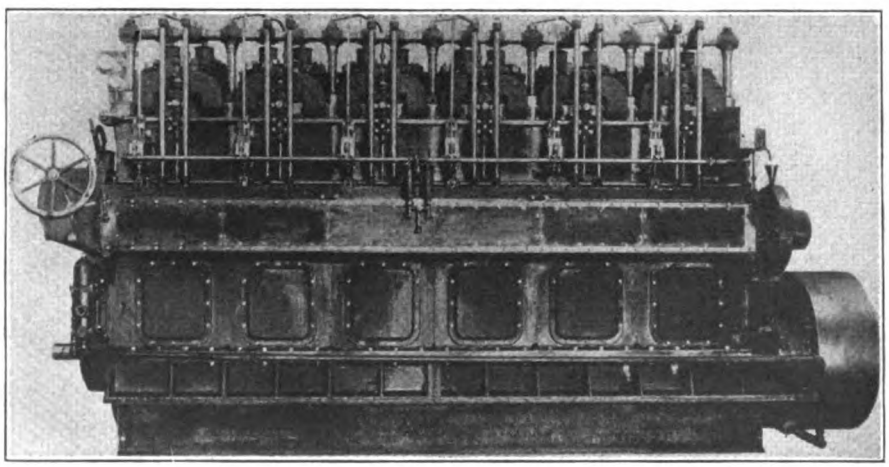
General Characteristics

Length over all	256 ft.
Length between perpendiculars	234 ft.
Beam molded	44 ft. 10 in.
Beam overall	61 ft.
Depth molded	19 ft. 8 in.
Draft	11 ft. 3 in.
Auto capacity	90
Propulsion system	diesel electric
Speed	14 knots
Total engine horsepower	1800 B. H. P.
Shaft horsepower	1250 B. H. P.
Make of engine	Nelseco
Number of engines	4
Engine horsepower	450 B. H. P.
Number of cylinders	6
Engine speed	230 R. P. M.
Generator capacity	275 KW.
Exciter capacity	40 KW.
Propelling motors, two	1250 S. H. P.

When the building program was originally contemplated, careful consideration was given to the relative merits of steam and diesel engine propulsion. This investigation soon disclosed the many economies and advantages to be derived by the use of diesel engines in connection with electric drive. Specifications were then issued and bids received from practically all of the prominent diesel engine builders in the country, as well as three large San Francisco shipyards and companies building electrical apparatus.

Considerable time was spent by the engineering department of the railroad in the determination of the most suitable type and make of engine. Engineering features of design, economy, reliability and performance records were carefully investigated and it was finally decided to equip all the boats with engines built by the New London Ship & Engine Co., Groton, Conn. Each ferry will have four 450 brake horsepower, Nelseco engines driving 275-kilowatt generators and 40-kilowatt direct connected exciters at a speed of 230 revolutions per minute. These generators will supply power to two double armature propelling motors, each of which is rated at 1250 shaft horsepower.

The diesel engines are of six cylinders, four cycle, single acting, mechanical injection type and constitute the latest development of the New London Ship & Engine Co. Many interesting features of design are incorporated, among which is the use of mechanical injection of fuel oil into the cylinders, which system is similar to that used by the M. A. N. company, Augsburg, Germany and their licensees. A cast iron cylinder block construction is utilized, into which are inserted the individual cyl-



A 450-BRAKE HORSEPOWER NEW LONDON SHIP & ENGINE CO. DIESEL ENGINE, TYPE 6 M1-22—FOUR OF THESE ENGINES EACH DIRECT CONNECTED TO A GENERATOR WILL FURNISH ELECTRIC POWER FOR PROPULSION AND AUXILIARIES IN EACH OF THE SIX NEW FERRIES RECENTLY ORDERED BY THE SOUTHERN PACIFIC RAILROAD

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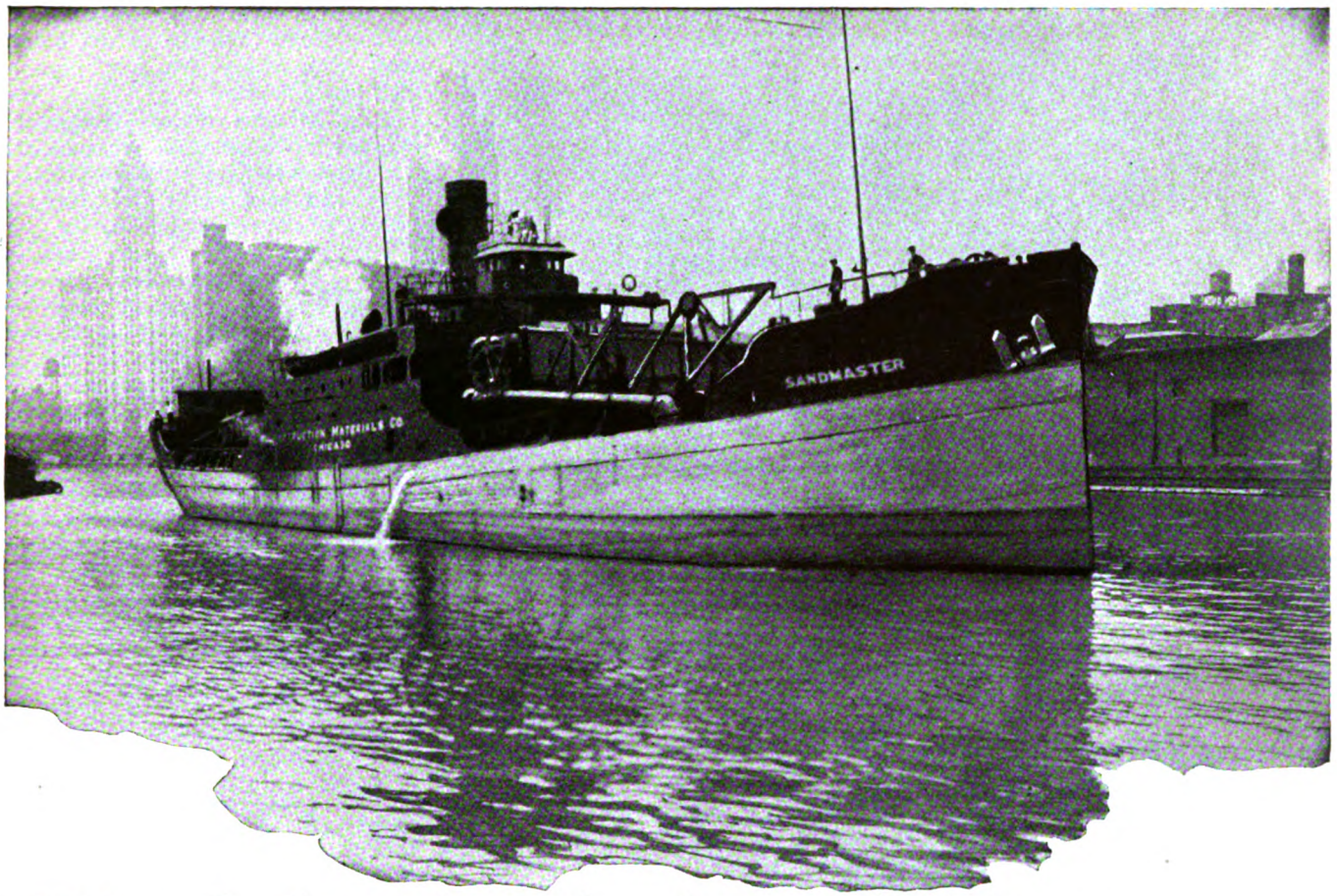

Diesel-electric—the logical drive for the converted *Sandmaster*

Once more electric power has been applied where its flexibility can be fully capitalized. The *Sandmaster,* operated by the Construction Materials Company for dredging and transporting construction materials, is demonstrating how well Diesel-electric drive fits the needs of a ship which, in addition to propulsion, has work to do that requires power in considerable quantity and applied at several points.

The *Sandmaster* is the first Diesel-electric dredge on the Great Lakes. Her entire electric propulsion machinery and practically all the electric auxiliary equipment were furnished by the General Electric Company.

Each year more ship operators are learning by experience the economic advantages of specifying G-E Equipment throughout.

The main machinery consists of two Diesel-engine generator sets (with direct-connected generators for furnishing excitation, lighting, and power for auxiliaries) and two propulsion motors, which are controlled independently from either the pilot house or the engine room. The motor-driven dredge pumps, which take power from either or both of the main generators, can be operated when the propulsion motors are also in operation.

All of the auxiliaries are electric. These include the steering gear, pumps, anchor windlasses, mooring winches, suction hoists, jet pumps, and motor-generators for lighting.

2-10

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

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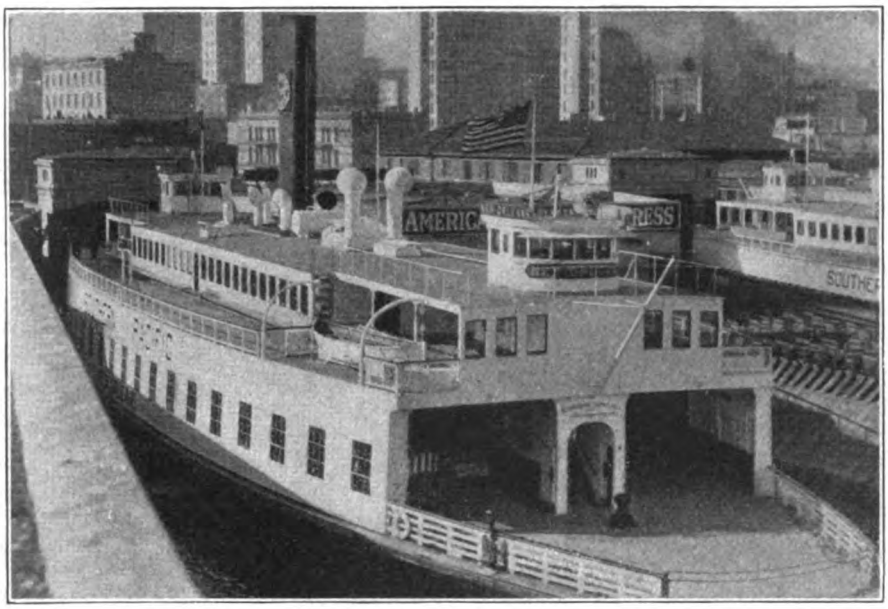


THE SOUTHERN PACIFIC AUTOMOBILE FERRY NEW ORLEANS IN HER SLIP AT SAN FRANCISCO. THIS FERRY WITH BOILERS AND RECIPROCATING STEAM ENGINES WAS COMPLETED JAN. 2, 1925. THE NEW FERRIES WILL BE OF ABOUT THE SAME SIZE AND GENERAL LAYOUT BUT WITH DIESEL-ELECTRIC PROPULSIVE POWER

inder liners. Steel tie bolts, extending from the top of cylinder block to the bed plate serve to transmit combustion forces directly to the crankshaft and relieve the cast iron of such tensile strain.

Other features include intake and exhaust valves mounted in cages and interchangeable and a patented design of cylinder head which gives superior cooling effect and minimizes the possibility of cylinder head fractures.

The orders in connection with the building and equipping of these ferries have been allocated as follows: Three boats to be constructed by the Union plant of the Bethlehem Shipbuilding Corp., San Francisco, two boats to the Moore Dry Dock Co., Oakland, Calif. and one boat to the General Engineering & Drydock Co., San Francisco. Electrical equipment for the six boats has been divided evenly between General Electric and Westinghouse. All 24 diesel engines have been awarded to the New London Ship & Engine Co., Groton, Conn.

It is expected that these ferries will be completed in record time and that they will be placed in operation in the spring of 1927.

Use Boyne City as Winter Quarters

BY C. T. McCUTCHEON

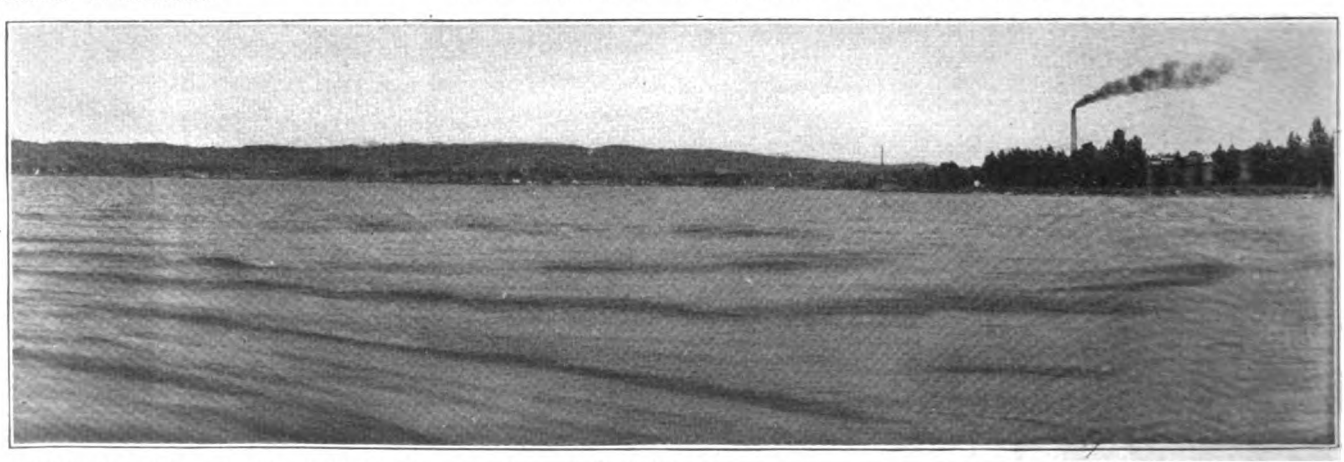
IN THE northwestern part of lower Michigan is a lake port that is not on the usual traffic routes. Lying as it does almost twenty miles from the big water, only those vessels which have direct occasion to trade at the port are aware that such a place exists. A decade or more ago, in the day of the schooner and barge, when lumber and timber products formed the bulk of Lake Michigan tonnage, the docks of Boyne City were alive with shipping, and boats to and from all lake ports, from Tonawanda to Chicago and Duluth, were a common sight.

Located at the head of Pine lake eighteen miles from the entrance at Charlevoix, with three miles of water front, with deep water close inshore, surrounded by high ranges of hills on all sides as a protection from gales, with abundant space for a hundred ships to anchor without any interference with each other, the harbor at Boyne City is ideal for loading and transferring cargoes.

For the past ten years the CICOA and later the GRIFFIN, Capt. J. H. Gallagher, of the Charcoal Iron Co. has made this port its winter quarters. Because of the captain's satisfaction with the conditions that exist and the manner in which his requirements for repairs have been met, the chamber of commerce of Boyne City believes others might be interested.

The port has good machine shops, capable of caring for all repairs to the machinery of vessels laid up. With rail transportation for supplies, with abundant electrical service available at any place on the harbor front, with freedom from the menace of gales, ice movements and floods, with good mechanics and free dockage, the business men of Boyne City think that the conditions for winter quarters are ideal.

The author, C. T. McCutcheon is second vice president and secretary of the Boyne City Chamber of Commerce.



PANORAMIC VIEW OF THE WATER FRONT AT BOYNE CITY, MICH.—THIS LAND LOCKED HARBOR IS SUGGESTED AS A SUITABLE WINTER HEADQUARTERS FOR LAKE VESSELS

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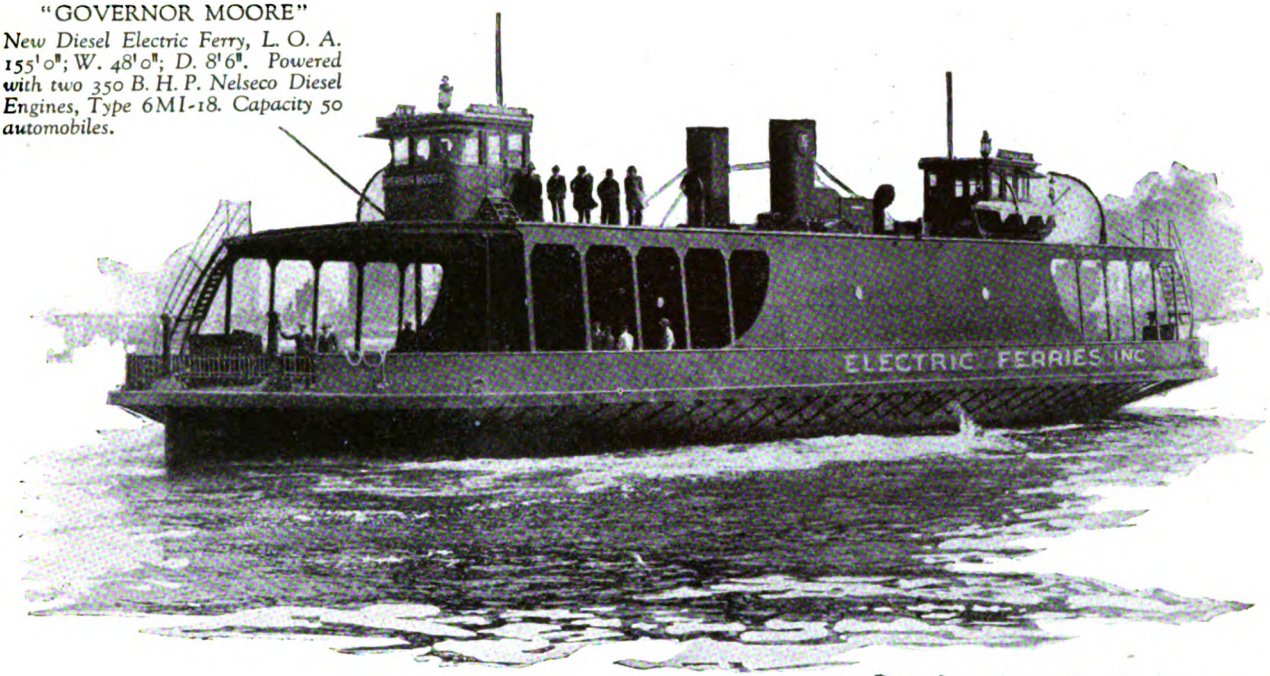
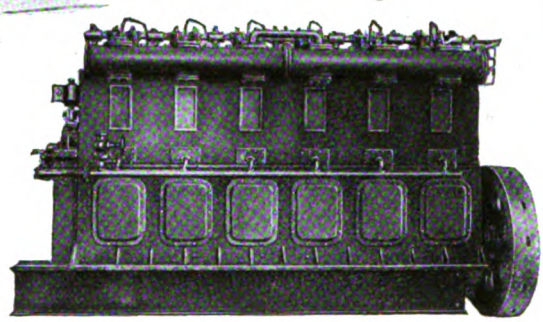
"GOVERNOR MOORE"
New Diesel Electric Ferry, L. O. A. 155'0"; W. 48'0"; D. 8'6". Powered with two 350 B. H. P. Nelseco Diesel Engines, Type 6MI-18. Capacity 50 automobiles.



First Diesel Electric Ferries in New York Harbor



Nelseco Diesel Engine of latest mechanical injection type, 350 B. H. P. at 280 R. P. M., Type 6MI-18.

A FLEET of six Diesel Electric Ferries has just been put in service between West 23rd Street, Manhattan and Weehawken, N. J. These vessels are the first of their type in New York —capacity 50 automobiles, no foot passengers carried.

Each ferry is powered with two 350 B. H. P. Nelseco Diesel Engines of the latest mechanical injection type. These engines are similar in design to the 24 Nelseco Diesels recently ordered by the Southern Pacific Railroad Company for use in ferry boats on San Francisco Bay.

You should ride on and inspect these new Diesel ferries for they are as radical a change from steam-propelled vessels as the first steam trains were over horse-drawn coaches.

You will be impressed with the smooth flow of power and the positive engine control just as the owners are impressed with the lower operating costs and the decreased personnel.

Nelseco engineers will gladly arrange an inspection trip and give you astonishing figures on the low operating cost of Diesel Engines for marine service. Write for Pamphlet MR.

NEW LONDON SHIP & ENGINE COMPANY
Groton, Conn., U. S. A.

Chicago Representative
H. JACOBSEN
25 North Dearborn Street

New York Sales Office
247 Park Avenue, New York

West Coast Representative
KING-KNIGHT CO.
Seattle, San Francisco, Los Angeles

NELSECO

Original licensees from and collaborators with M.A.N. since 1910

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Disarmament a Gamble

(*Continued from Page* 12)

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While Uncle Sam's lack of light cruisers places his navy in a weak position in a tactical sense, a part of the treaty negotiated in Washington in 1922 weakens the United States in a strategic sense. Incidentally, tactics concerns the fighting when within fighting distance and strategy, which is much broader, deals with placing the fleet in such position that its pressure will end war in favor of the nation which uses the soundest naval strategy. Sometimes a war is won by total destruction of the enemy fleet, as in Nelson's great victory at Trafalgar, and sometimes by blockade and fleet pressure as in the American Civil war, or in the World war where Germany was finally strangled by the British fleet, though the German fleet was still in existence.

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The weakening of the United States in a strategic sense, by the Washington treaty, came from our virtual promise not to use the fleet west of Honolulu. It was a virtual promise, because a fleet must be supported by nearby bases if it is to be kept in operating condition, and in the treaty the United States agreed to make no improvements in bases now incapable of keeping the fleet in fighting condition.

The United States has two great policies, the Monroe doctrine, which concerns the two American continents, and the open door, which applies to China. In addition, America has its major over-seas interest in the Philippine islands. Now, to protect an interest or to support a policy, the fleet must be able to operate in the area where the policy or interest applies. Even those who know little must realize that it takes many things to keep a complicated machine, like a modern fleet, in operating condition —such as stores, spare parts of machinery, coal, fuel oil, machine shops, dry docks, etc. Those who followed the naval end of the World war know American battleships were sent across the Atlantic so Admiral Jellico would have a preponderence of strength even when a part of the British force was away at naval bases for dry docking and repairs. A few know that the British repair bases were moved as close as possible to Scapa Flow, the base from which the British fleet operated.

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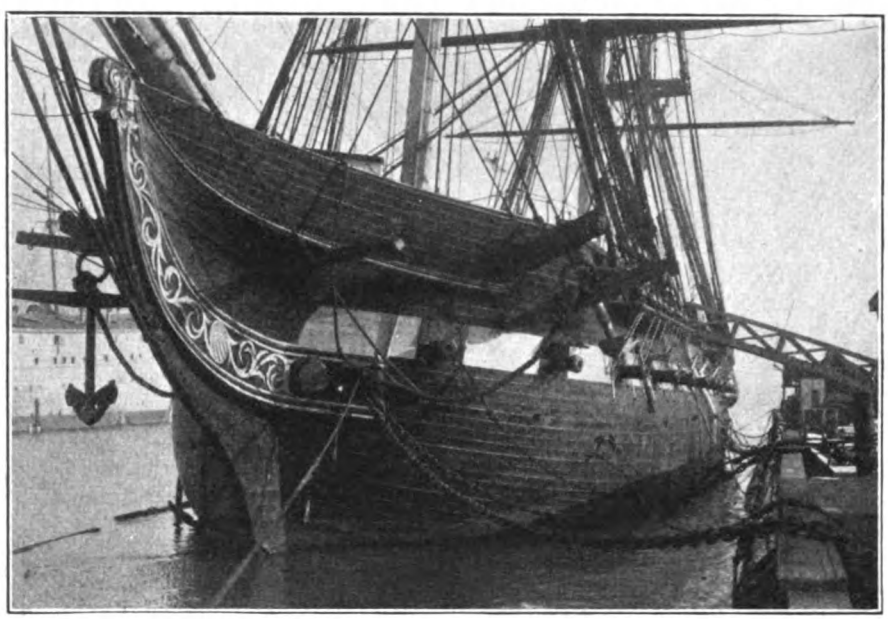
Guns of Old Ironsides

(*Continued from Page* 21)

make the experiments, and the owner of the works, or any person whom he may appoint for that purpose.

9. That to ascertain the strength of the trunnions the cannon must be placed on two pieces of wood having indentations large enough to receive two thirds of the trunnions, and with the hinder part at a sufficient distance from where the trunnions lodge, so that the breech may be inclined in any direction, but never so as to rest on the ground. The proof by powder must be made on these pieces of wood.

10. That the cannon which shall have stood the proof by powder, shall be raised from off the temporary carriage, and placed upon a supporter, so that they may be filled with water. That should the water on being compressed filter through any part of the cannon, it cannot be received though it has stood proof.



U. S. S. CONSTITUTION FROM BROAD OFF THE PORT BOW—THE GUN DECK BATTERY AND THE ANCHOR WITH ITS CABLE LAID HAWSER IS PLAINLY SHOWN—THE ORNAMENTAL SCROLLS ARE NOT REPLICAS OF THOSE OF 1812

11. That the cannon which shall have stood the aforesaid examination and proofs, shall be subject nevertheless to be re-examined and should new holes be detected, or the ones tolerated found to have been enlarged by the firing; all such cannon must undergo a second proof, but of one discharge only; then if the holes exhibit no further enlargement, they shall be admitted, and receipted for, after being weighed.

12. That the weight of each cannon received, shall be marked on the left trunnion.

"As cannon which have not undergone the above examination and proofs, cannot be used by the United States without putting the success of those military undertakings in which they may be engaged, at risk; and as the principles and regulations here laid down, have been the result of much experience, and long adopted for the verification of cannon by the principal nations in Europe they may be considered as guides that ought not to be departed from. It is requested therefore, that the contract shall be so formed, as to ensure a strict and punctual compliance with each and all of the above mentioned conditions."

P. S. "The draft for the 12-pounders, which is in hand, will be furnished in a few days."

The "water test" prescribed in paragraph ten was deemed to be of sufficient importance to merit a special letter of instructions. These were issued about two weeks later.

War Office
Sept. 27, 1796.

"Secretary of the Treasury.
Sir:

"I believe the best explanation, relative to the proofs by water, will be to give Mr. Hughes a more detailed view of the mode in which the experiment will be directed to be made.

"The object of the water proof is, to discover whether there are any holes which penetrate through the sides of the cannon. For the purpose, the examiners will be instructed after the cannon have undergone the proof by powder to place them upon a thick piece of timber so they may be easily made to turn upon it. The touch-hole will be stopped with a wooden peg covered with tallow. The cannon will then be raised and the case surrounded with linen so that any water which may fall down the sides, on filling the bore, shall not be confounded with drops that may filter through the metal and with the same view the water will be poured into the cavity by means of the spout on a watering pot. The water will then be pressed on by a rammer covered with thick cloth so as to fill exactly the muzzle of the cannon. During this operation, the exterior will be attentively watched to see whether any water passes through the metal. If the least filtration appears the cannon will be refused."

It is evident that the "watering pot" method of test adopted by our war office for marine guns was a long step in advance of the "smoke test" for discovering cracks used in the English service fifty years earlier. We know this because Mountaine's *Seaman's Vade Mecum and Defensive War by Sea* published in London 1744, has two sections in his book which tell

4. How to find the flaws and cracks in a piece of ordnance.
5. How to determine if a piece of ordnance be honey combed.

The author of this work, William Mountaine, a teacher of mathematics tells one to proceed thus when wishing to determine whether a piece of ordnance contains flaws or cracks.

"Take a large piece of dry touch-wood and set it on fire in several places at once; when half its superficies smokes put it into the chase and stop the mouth and touch-hole both together: If the gun be without cracks, the touch-wood will be extinguished for want of air, otherwise it will burn out; and perhaps you may see the smoke."

When it comes to finding out if a piece of ordnance is honey combed, he advises:

1. "Take a looking glass, and reflect the beams of the sun into the chase, which will illuminate and render visible the pores in the concave superficies; but if the sun do not shine, put a candle upon the end of a half-pike and thrust it into the piece, and that will show the pores.

2. "Or this: Take a searcher made with several springs with points bending outward; contract the springs, until the instrument will enter the mouth of the piece. Move it in a spiral or circulating manner on the chase and if there be any honey-combs the point will find them out."

On March 19, 1798, the iron 24-pound cannon intended for the frigate UNITED STATES, a sister to the CONSTITUTION, were found unfit for service. At the instance of the President of the United States, a request was sent to John Jay asking for a loan "of thirty of the iron 24-pound cannon which the state of New York had obtained from a foundry in Connecticut." Did any such experience befall the thirty 24-pounders for the CONSTITUTION? The answer is: The government failed at first to get the 12-pounders intended for her upper deck battery. This is shown by the following letter—sent out in preparation for our war with France:

War Department
May 30, 1798

"His Excellency
The Governor of
Massachusetts.
Sir:

"It is extremely desirable that all the naval forces the United States can command should be put into a

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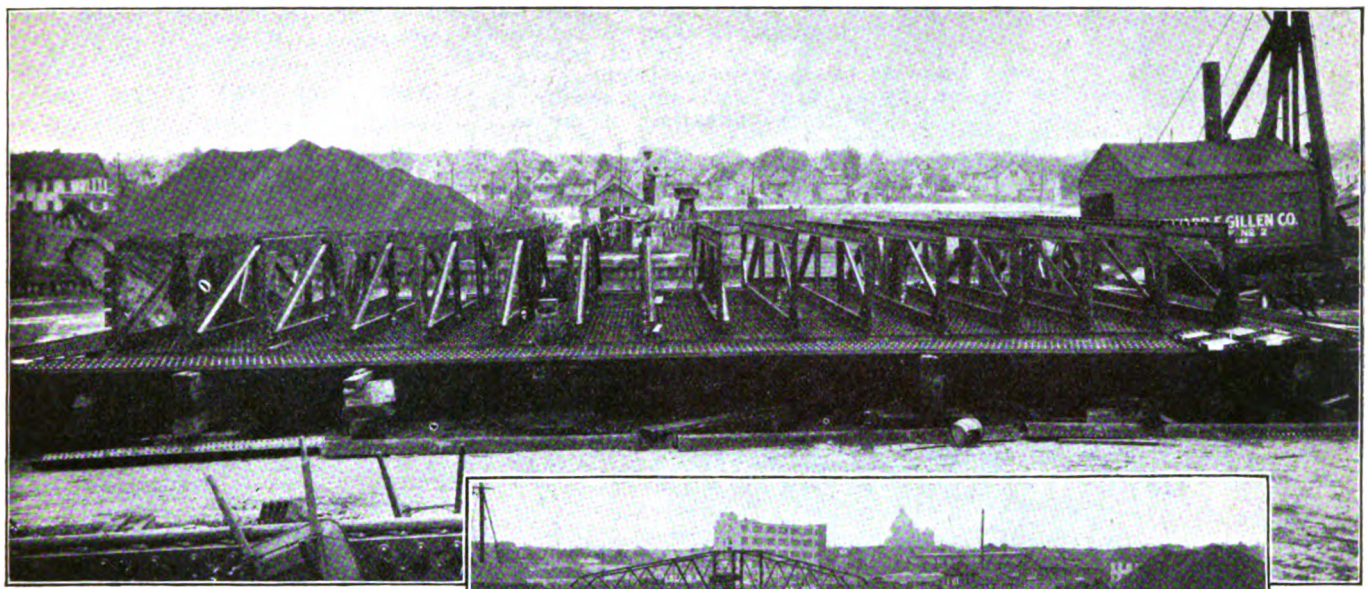

Pile driver and derrick are included in the equipment of this Ellis Barge being built by Edward T. Gillen Co., Milwaukee. Wisconsin Bridge Company is fabricating the steel.

—and on the Great Lakes

THE value of the Ellis Channel System of Steel Hull Construction has been recognized by shipping interests in all parts of the country.

Ease with which Ellis Barges may be knocked down for export, low cost construction and maintenance, with no sacrifice of strength or sea-worthiness, make the Ellis System particularly suitable for varied types of service at home and abroad.

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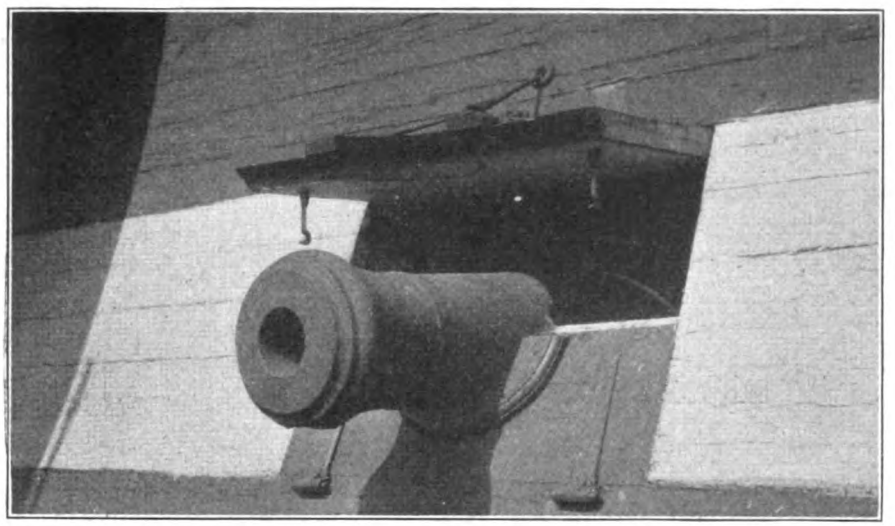
state of activity as speedily as possible.

"Hitherto and particularly by the failure of a contract the government has found it impracticable to procure the cannon requisite for the upper battery for the frigate CONSTITUTION at Boston. It has however, lately been stated that there were at Castle Island, in the harbor of Boston, nineteen iron cannon of caliber to carry eighteen pound shot, which from their length and weight appear to have been designed for ships use, and to be improper for the embrazures of fortifications. That Captain Nicholson has seen and examined these cannon and is very desirous to obtain them for his ship.

"By the direction of the President, I have therefore to request of your excellency a loan of fourteen or sixteen of the cannon mentioned, and to offer on the part of the United States an engagement, either to return the same guns as soon as others can be provided for the frigate, or to replace them with guns equally good, and in the meantime, if desired, to order the same number of thirty 2-pound cannon from Providence to, and for the defense of Boston Harbor.

"It is presumed that the state of Massachusetts have had balls purposely cast for these 18-pounders; if so, and your Excellency will furnish with the cannon a suitable quantity of shot, the United States will punctually and promptly return an equal quantity."

This request was honored, and English made guns thus formed a part of the CONSTITUTION'S battery. Her ammunition and stores did not prove to be so difficult to assemble.



MUZZLE OF 24-POUNDER (LONG) U. S. S. CONSTITUTION—THE LOWER HALF OF THE PORT HINGES DOWN, THE UPPER HALF IS HAULED UP BY THE CROWFOOT LANYARD

Reviews of Late Books

Ship Stability and Trim Made Easy, by Oswald Watts, 53 pages, 5 x 7½ inches; published by Crosby Lockwood & Son, London and furnished by MARINE REVIEW for $0.75 postpaid and in Europe by the Penton Publishing Co. Ltd. Caxton House, London for 2 shillings and 6 pence net.

This interesting little book is intended to meet all up-to-date requirements on the important subjects of stability and trim, in a practicable and workable manner.

It is necessary for efficient performance that the officers should know how to load a vessel to the best advantage, and what can be done with the vessel when so loaded. Definitions, diagrams and the descriptive text clearly and simply covers this subject and should with practical experience serve to give to the officer the information he needs. The examples given are from actual experience at sea.

Diesel Engines, by David Louis Jones, 565 pages, 6 x 9 inches; published by the Norman W. Henley Publishing Co., and furnished by MARINE REVIEW for $5.00 postpaid and in Europe by the Penton Publishing Co. Ltd., Caxton House, London for 25 shillings, net.

This is a practical book, written by a practical engineer who holds a commission as chief machinist in the United States navy and who is instructor in the diesel engine department of the navy submarine school. It is a complete and modern work and it explains the elementary principles of thermodynamics and the principles of operation of all types of engines. Treatment is given in detail of the construction of engines, fuel pumps, fuel injection valves, starting and reversing systems, air compressors, governors etc.

The operation, repair and maintenance of the diesel engine, adjustments, indicator cards, engine testing, the use of fuel and lubricating oil are all explained. The book has been very carefully prepared and the contents have been selected with the view of serving those seeking real information. It is particularly adapted for the steam engineer who is preparing to operate diesel engines. We believe this book would be useful for every marine operating engineer and others chargable with the maintenance of diesel engined ships.

Open Permanent Office in Cleveland

In order to be better able to care for its rapidly growing business on the Great Lakes, the Sperry Gyroscope Co. has opened an office and display room in the Rockefeller building, Cleveland, according to an announcement recently made by Charles S. Doran, president of the Sperry company.

According to Mr. Doran, many of the new and interesting developments of the company will be placed on exhibit at these quarters where they may be inspected by officials and officers of the local steamship companies. It will also be of interest to steamship officials and officers to learn that the Sperry company is planning to operate a school in Cleveland this winter as it has done for the past three years.

J. A. Tison who has been representing the company in the Great Lakes district for the past four years, will be in charge of the new office.

Barry to Work on Sales

G. C. Barry has been appointed assistant to E. G. Hines, general sales manager of the American Brown Boveri Electric Corp., 165 Broadway, New York. Mr. Barry began his electrical career with the Western Electric Co. in 1912. Three years later he became associated with the Hart Mfg. Co., Hartford Conn., remaining until the outbreak of the war. In 1923, he returned to the Hart company as sales manager with offices in New York, and was shortly after appointed general sales manager at Hartford.

John A. Moran, president of the Atlantic Basin Iron Works, Brooklyn, died Oct. 20 at his home in that city.

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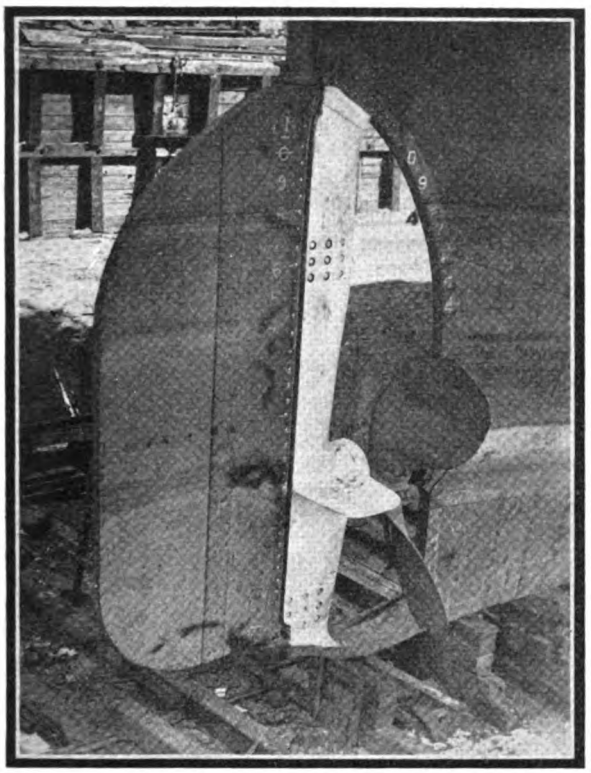
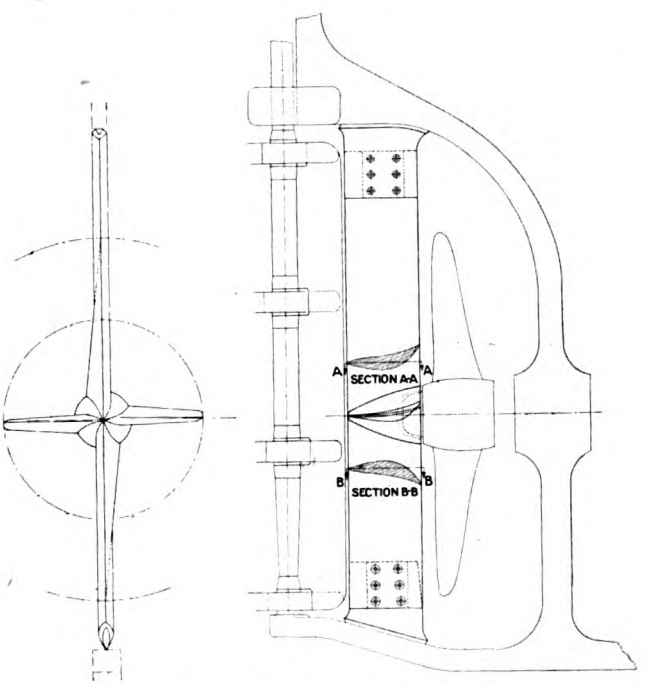
Contra-Propeller

means Increased Propulsive Efficiency



Contra-propeller as installed on S.S. Lehigh



Type of Contra-Propeller installed on M.S. Steel Chemist and M.S. Steel Electrician

American Vessels equipped with Contra-Propellers.

S. S. NORFOLK
S. S. SUFFOLK
Coastwise Transportation Co.
S. S. STEEL NAVIGATOR
S. S. FAIRFIELD CITY
M. S. STEEL CHEMIST
M. S. STEEL ELECTRICIAN
S. S. STEEL TRAVELER
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T. S. S. STEELORE
Ore Steamship Co.
S. S. JONANCY
S. S. FREEMAN
S. S. BYLAYL
Pocahontas Steamship Co.
S. S. SAMUEL Q. BROWN
Tidewater Oil Co.
S. S. FLORENCE LUCKENBACH
Luckenbach Steamship Co.
S. S. CALISTOGA
Monticello Steamship Co.
S. S. LEHIGH
Bethlehem Transportation Co.
T. S. S. JOHN D. ARCHBOLD
Standard Oil Co. of N. J.
S. S. ELISHA WALKER
Pan American Petroleum & Transportation Co.
S. S. DIXIE ARROW
Standard Transportation Co.
TUG LYDON
TUG JAS. EDWARD
Great Lakes Dredge & Dock Co.
S. S. GULFLAND
Gulf Refining Co.
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United Fruit Co.

THE installation of a Contra-Propeller makes possible a decrease of from 10% to 20% in indicated horsepower with the vessel maintaining the speed made prior to fitting the Contra-Propeller, or conversely it will realize a corresponding increase in speed, maintaining the old horsepower. Furthermore, the direct rearward wake produced by the Contra-Propeller insures better steering and reduces rudder pintle wear, while the horizontal blades also diminish pitching.

The resultant lower operating cost justifies the investment.

The Contra-Propeller is manufactured in the United States solely by the Bethlehem Shipbuilding Corporation, Ltd. under license from Th. Goldschmidt Corporation, 68 Beaver St., New York City, exclusive representative for the United States and Canada.

Write us and obtain the benefit of advice from our experienced engineers.

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Naval Architects Meet

(*Continued from Page* 14)

launching of the airplane carrier LEXINGTON. When needed, information of this character is invaluable. The problems in connection with the launch of the LEXINGTON were quite different from those at the launch of the airplane carrier SARATOGA, a paper on which was presented last year by Mr. Rigg. The two papers taken together therefore present a great deal of valuable data on the methods of launching exceptionally large and heavy vessels. The LEXINGTON it is stated in Mr. Wakeman's paper is the largest ship, in weight, ever launched in this country; and only two heavier vessels have ever been launched in the world, these being transatlantic liners. The length overall of the LEXINGTON is 880 feet; the length between perpendiculars is 850 feet; breadth molded at bulge, 105 feet 3¾ inches; breadth molded at flying deck 105 feet 8 inches; depth molded to flying deck at center 74 feet 3 inches. The launching weight of the ship in long tons was 25,517 and the weight including the cradle was 26,897 long tons.

4. *"Analysis of the Standardization Trials of the U. S. Battleships Maryland, West Virginia and Colorado,"* by Capt. William McEntee, C. C., U. S. N., council member.

It was the purpose of Captain McEntee in this paper to explain discrepencies between the results calculated and deduced from model basin data and the actual results obtained during the standardization trials of the completed vessels. This particular case presented anexceptional opportunity for such analysis due to the fact that the MARYLAND and WEST VIRGINIA are sister ships. One of the conclusions made by the author was that the results of the comparison probably warranted the conclusion that for relatively low powered ships at least, the power required for their propulsion can be estimated from self-propelled model tests with greater accuracy than the power can at present be measured on the full sized ship during her trials.

This paper caused a lively discussion, Admiral Tawresey who read the paper for the author and who as head of the board of inspection and survey conducted the standardization trials took exception to some of the author's deductions. Other contributed remarks severely criticised model basin methods and supported the accuracy of the full size trial data. The fact remains, however, that Captain McEntee in his very thorough and able analysis points with supporting evidence to the possibility of error in full size trial data.

5. *"An Investigation of the Behavior and of the Ultimate Strength of Riveted Joints Under Load,"* by Commander E. L. Gayhart, C. C., U. S. N., member.

Commander Gayhart has contributed a paper of real practical value. It represents a report on tests carried out at the direction of the bureau of construction and repair. Professor Hovgaard of the Massachusetts Institute of Technology collaborated in the planning of these tests which were carried out under the author's direct supervision at the bureau of standards. The work was directed primarily to the study under tensile forces of slip phenomena and stress distribution in riveted joints. Variation of rivet spacing was investigated as was also the effect of using rivets of a grade softer than the material of the plates. Many interesting conclusions were reached as to the advantages of arrangement, spacing and material in rivets.

6. *"Corrosion,"* by W. Bennet, member.

Such serious difficulties have been experienced by corrosion in comparatively new ships and especially in tankers that the matter has become one of prime importance for the classification societies and insurance companies. Mr. Bennet's investigation covering a long period of time, therefore represents a valuable contribution to the marine industry. This study is of particular interest to owners of new vessels who naturally are seriously concerned as to their ultimate life and in measures to prevent rapid deterioration. The author states that whether the serious wastage and corrosion recently found on the rivet points on the bottom of many vessels is due to electrochemical action consequent to their scrubbing over muddy bottoms at Gulf ports, to over-heated or overcalked rivets, to the action of polluted rivers, to the composition of the rivet steel and plating, to unduly long periods between drydocking, to insufficient or inefficient cleaning and painting, or as is probably nearer the truth, to a combination of causes including all of these and possibly more, the very greatest care and forethought is necessary in both the selection of suitable material and the work of building them into the hull of the ship.

Mr. Bennet calls attention to an investigation made of the steel of the LEVIATHAN and some English steel which had been attached to her stem. Though Mr. Bennet does not state so in his paper this investigation was initiated by MARINE REVIEW. The condition of the steel in the hull of the LEVIATHAN and of the attached English steel, when this vessel drydocked in 1923 for the first time in five years was called to the attention of Professor Jack of the Massachusetts Institute of Technology who turned over the information given to him by MARINE REVIEW to Prof. G. B. Waterhouse. Samples of the steel were procured for Professor Waterhouse on the initiative of MARINE REVIEW and due to the splendid co-operation of Admiral de Steiguer, then commandment of the Charlestown navy yard. Doctor Waterhouse at the request of the editors of MARINE REVIEW, prepared after an investigation extending over a period of a year, an exclusive article on his work which was published in the August 1924 number of that publication. It was from this article Mr. Bennet quoted in his reference to the LEVIATHAN steel.

7. *"The Strength of Propeller Shaft Struts,"* by Lieut. W. P. Roop, C. C., U. S. N., visitor.

The author summarizes his paper by the statement that a propeller shaft bracket is much better disposed for strength when the strut arms enter the boss radially instead of tangentially. The subject has been covered in this paper both from somewhat of a theoretical point of view and also by many practical examples. Some interesting photographs are shown of strut fractures, also diagrams of struts and forces involved.

8. *"The Flettner Rudder,"* by Olav Overgaard, member, and J. Livingston, visitor.

The authors have quite thoroughly described and illustrated the Flettner rudder. The Flettner rudder was origially intended for airplaines and about 500 of these craft have been equipped. It was first tested on a European merchant vessel in 1921 and proved successful. Since then over 100 vessels have been equipped of which 25 are large seagoing ships and the remainder tramp steamers and barges up to 3000 tons. The principle of the Flettner rudder is that the main rudder which is partly balanced is free to rotate about its own axis and is steered by the fin or secondary rudder which is also partially balanced. The main rudder stock is hollow and enters the hull through a stuffing box and it extends to the main deck where the weight and thrust are taken up by a suitable thrust bearing.

9. *"Engineering Aids to Navigation,"* by Commander Stanford C. Hooper, U. S. N., visitor.

In this paper the author has enumerated and explained modern aids to navigation. He particularly points to the enormous assistance rendered the science of navigation by the phenomenal development in radio and sound apparatus and its uses. His discussion is particuarly directed to the use of such apparatus in assisting a vessel in making a safe and expeditious passage from one port to another. The author covers in his paper a brief general history of the development; description of how the appartus is used as an aid to navigation and the extent of use of apparatus and instances of results obtained. The paper is illustrated by many diagrams and several photographs.

10. *"Considerations Governing the Selection of a Fleet for the Upper Mississippi River,"* by Brig. Gen. T. Q. Ashburn, U. S. A., visitor.

In this paper General Ashburn gives the results of studies made to build a suitable fleet of river boats for service on the upper Mississippi from St. Louis to the Twin Cities in the open season of the year, and for service on the lower Mississippi or the Warrior river during the winter. The problem was to design a fleet of towboats and barges which could operate successfully as a common carrier and which could be constructed for the sum of $600.000. The distance on the river is 768 miles with a dependable eight months' channel of 4 feet and a current varying from nothing to eight miles an hour. After a thorough inspection of the route in conjunction with the naval architects Cox and Stevens and Thomas R. Tarn and after much study it was finally decided as a working basis

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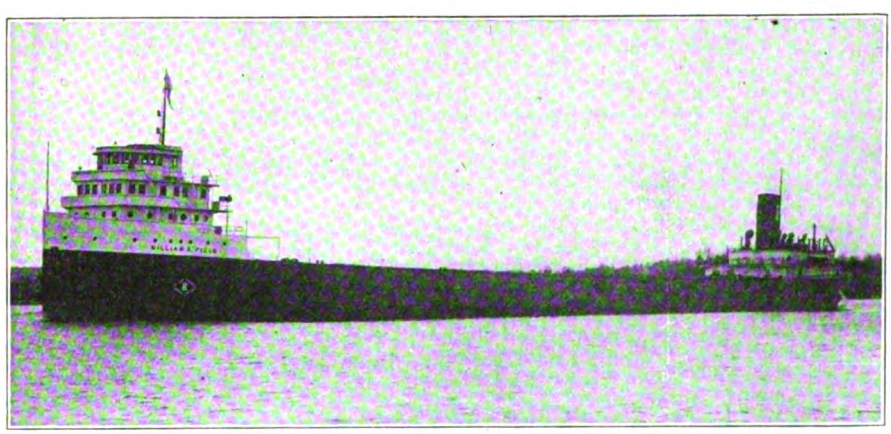

Steamer William K. Field

604 ft. Long, 60 ft. Beam, 32 ft. Depth. Deadweight Tonnage 12000.

OVER half a million tons of freight carried—forty six cargoes of ore and coal delivered in seven months and seventeen days by the steamer William K. Field.

This remarkable performance earned her the title, "Champion Freight Carrier of the World". During the season 1924 on the Great Lakes she registered a total of 552,014 tons. *An unprecedented accomplishment!*

The William K. Field is owned and operated by Reiss Steamship Company, Cleveland, Ohio. Her type of construction permits rapid loading and discharge of cargo. This was an important factor in her record breaking performance.

Builders and Repairers of Ships and Engines

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that the initial fleet should consist of three 600-horsepower towboats at $135,000 each and fifteen 500-ton steel barges at $18,000 each. The total of these estimates amounted to $675,000. The towboats it was decided must be capable of making 3 miles per hour up stream and 6 miles per hour down steam, towing 1500 tons.

The final dimensions decided upon for the towboats were 160 feet by 35 feet and for the barges 126 feet by 30 feet. It was also decided that towboats should develop at least 600-horsepower and should not have a draft of more than 3 feet 6 inches. For power the twin screw tunnel with diesel engines as well as diesel-electric were given consideration as was also diesel gear drive. General Ashburn states in his paper that he is an ardent advocate of the twin-screw tunnel-type diesel towboat either electric or direct drive for use on a river where there is a navigable channel of 5½ feet or more. He stated, however, that the idea of a diesel electric stern wheel towboat had to be abandoned in this instance because it did not seem possible to get a plant of this character to develop the required power on a draft of 3 feet 6 inches on account of its excessive weight without introducing other elements one of which was cost.

It was finally decided that the power boat should be of twin tandem compound condensing stern-wheel type with oil-burning water tube boilers. The hull and main deck houses are to be of steel and the pilot house and crew accommodations are to be of wooden construction. An interesting point was brought up in the paper that oil and not coal would be used in any case no matter how expensive it might be because of the necessity to lighten the task of firing and so be able to get and keep crews. The barges are to have a cargo capacity of 280 tons on a 4-foot draft and 520 tons on a 6-foot draft. This paper is very interesting in that it deals with specific problems the study of which has been carried out with a great deal of thought and labor and gives the conclusions arrived at with numerous plans showing the type of towboat and barge finally evolved.

11. *"Performance Tests on Diesel-Electric Stern-Wheel Towboats,"* by C. H. Giroux, visitor.

The author is electrical engineer attached to the United States engineer department. The purpose of the paper is to make available the results of tests recently conducted on two stern-wheel towboats designed and operated by the United States engineer department. Both of the boats under consideration are equipped with diesel-electric propulsion machinery. They do differ, however, considerably in size, power and method of transmitting the energy to the wheel. The two boats for which tests are described are the BURNETTE, 84 feet 2¼ inches in length overall with a Winton diesel engine and General Electric electrical equipment. The other vessel, the GOUVERNER, built by Howard Shipyards, is 121 feet in length overall and is equipped with two Winton diesel engines and with General Electric electrical equipment. The paper covers quite completely speed trials under varying conditions of power and wheel revolutions. The results of the speed trials are plotted. The horsepower was also carefully determined. Tests were also made on accelleration and decelleration. The tests describe in this paper the author states, is the beginning of further work which he hopes to carry out along similar lines.

12. *"Some Considerations in Design of Ferryboats,"* by Prof. C. F. Gross, member, and Charles Green, visitor.

The authors of this paper have contributed valuable information for those who are concerned with the building and operation of this large and widely distributed class of domestic craft. The rapidly expanding population and prosperity in territories adjacent to bodies of water have greatly increased the demand for this type of craft. Transportation of railway cars, automobiles and passengers is growing rapidly. This paper is therefore both timely and useful. The paper is limited primarily to ferryboats engaged in the transportation of passengers. It is illustrated by photographs and line drawings of numerous recent ferries, and principal particulars are also given.

The summing up of the conclusions of the authors in regard to the question of the selection of the main propelling machinery for a ferryboat follows:

A. That the straight through shaft propeller drive for ferries requires considerable more power than the diesel or turboelectric system.

B. Nothing can surpass the diesel or turbo-electric drive for flexibility or remote control.

C. Fuel consumption on a side wheel paddle ferryboat is about the same or a little lower than the turbo-electric boat.

D. Intital costs of the walking beam paddle wheel steamer and the steam reciprocating engine installation are less than the turbo-electric or diesel-electric installations.

E. The lowest fuel consumption is that of the diesel-electric system, but its drawback is the initial cost and greater weight.

13. *"Diesel-Electric Propulsion,"* by W. E. Thau member.

The author of this paper has recently been made manager of marine engineering for the Westinghouse Electric & Mfg. Corp. He has been closely connected with electric propulsive machinery of the largest powers such as in battleships and in the smallest diesel-electric merchant installation. He pointed out that many of the advantages and outstanding features which were claimed for the diesel-electric form of propulsion have been thoroughly established and additional advantages have developed and that certain of these advantages have proved to be of greater importance than originally regarded.

Mr. Thau stated that of the total 66 diesel-electric drives which have been installed and ordered up to the present time 59 have been ordered during the last five years. He reviewed the essential features of the diesel-electric form of propulsion and pointed out the advantages in connection with some of the more important installations of the last few years. Comparisions with other forms of drive were used only as a means of illustrating performance. He discussed the application of this type of power in tug boats, in smaller lake cargo vessels, in tankers, yachts, fireboats, ferryboats, and river boats.

The only field thus far untouched by diesel-electric system of propulsion is in the case of passenger vessels. The name and type and other particulars were given for vessels equipped with diesel-electric drive. The paper was illustrated by numerous photographs. Mr. Thau's paper caused a lively discussion, the steam people showing very evident signs that they were far from being counted out, particularly in view of the developments on the KING GEORGE V. Steam is still a factor, will continue to be so, and may possibly, after development has been sufficiently stirred, begin to compete with the diesel.

The attendance during the meetings for the reading of papers was exceptionally good. Realizing that the life and virility of the society must depend upon recruiting younger men for membership, Capt. McAllister, president of the American Bureau of Shipping offered the suggestion, which was carried, that the initiation fee be waived in the case of junior applicants.

Annual Banquet Well Attended

Nearly 500 members and their guests (and guests were limited one to each member) attended the annual banquet which was held in the grand ballroom of the Waldorf-Astoria, New York on the evening of Nov. 12. The usual reception preceded the banquet and many friendly greetings were exchanged and acquaintanceships renewed.

The president of the society, Rear Admiral D. W. Taylor, C. C. P. S. N. retired, presided as toastmaster and he performed this function with such tactful brevity that he earned the admiration of all the guests. The speakers were Gen. A. C. Dalton, president of the Emergency Fleet Corp. who spoke on the "Merchant Marine;" the Hon. Silas Tiller, dirt farmer, "A View of American Shipping From the Wide Open Spaces;" Hon. William P. MacCracken, Jr. "Commerical Aviation;" and Homer L. Ferguson.

General Dalton spoke with enthusiasm about the present and future possibilities of the American merchant marine, providing some reasonable agreement could be reached so that congress could act with unanimity on this question. In the meantime services are being maintained in all strategic routes by the Fleet corporation. He dwelt upon the very important service that our ships are now able to render in moving cargoes of grain and cotton and other commodities deserted by the foreign ships

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MARINE DEPARTMENT

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FRICK BUILDING PITTSBURGH. PENNA.

BUILDERS OF

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CAR-FLOATS

SAVE WEIGHT- SAVE PAINT- *and* SAVE MONEY

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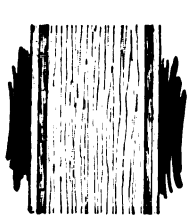
Layers of wood welded together with a water resistant cement

for Bulkheads, Ceilings, Door Panels, Walls, & Drawer Bottoms



5 ply construction of Weldwood in hard woods. Welded with same water resistant cement used in U. S. Aircraft propeller construction.

Weldwood is furnished in all hard and soft woods—will not warp or buckle, stands by itself and requires no backing. Insures light weight construction above the water line. Needs ⅓ less paint than composition material by actual test.

Naval architects can choose from ample stocks at New York and Detroit.

Quick deliveries from stock.

Catalog with prices on request.

5 ply construction of Weldwood in soft woods. Welded with same water resistant cement used in U. S. Aircraft propeller construction.

UNITED STATES PLYWOOD COMPANY, Inc.

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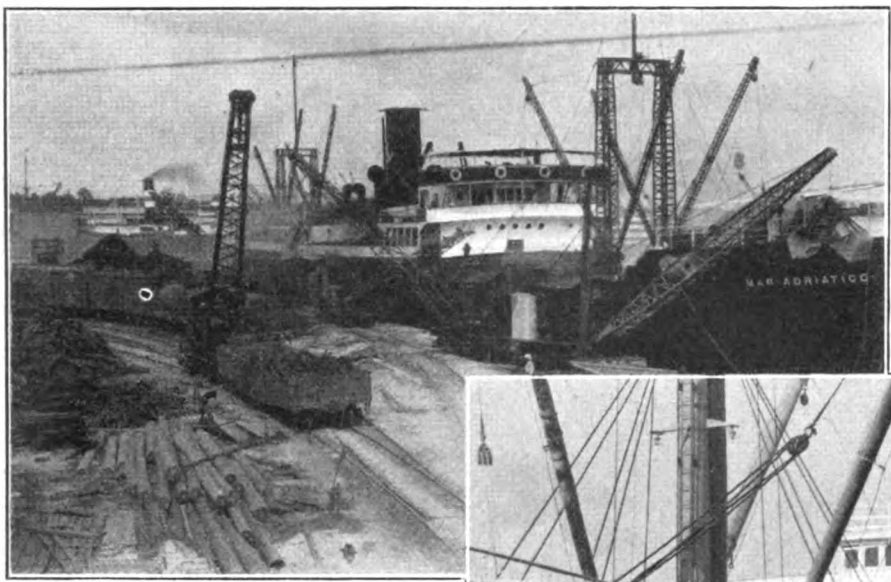


LOCOMOTIVE CRANES, A PART OF HOUSTON'S WHARF EQUIPMENT

Port Houston Grows

(*Continued from Page* 27)

across five railroad tracks into the large concrete warehouse with a floor space of over 200,000 square feet. Escalators for side port vessels are also provided on wharf No. 1 and No. 4, this type of equipment is also installed on the new Southern Pacific—Morgan Line terminal built at Clinton, three miles below the turning basin.

Unloading Equipment

A 20-ton electric traveling crane for handling heavy shipments to and from the warehouse and wharf, and for loading of cars, is also a part of the equipment of wharf No. 4, while locomotive cranes, cargo hoists and electric magnets are available for handling lumber, steel rails, scrap, etc., at various parts of the waterfront.

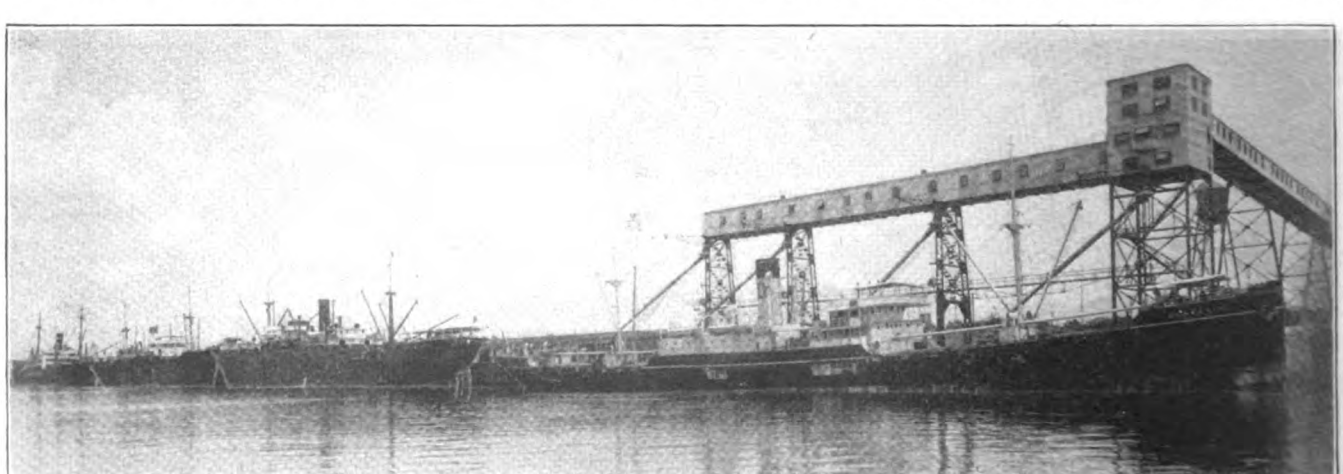
Vessels are loaded at Houston with the greatest of dispatch by a trained corps of stevedores and longshore workmen, oil vessels seldom remaining in port more than 24 hours, and cotton carrying ships making a turn around, when necessary, with a cargo of fifteen to twenty thousand bales in two or three days.

Oil bunkering facilities are provided on the public wharves and at the Houston compress wharf, which is below the turning basin, where vessels can be bunkered while taking on and discharging cargo, thus saving many hours time. Coal bunkering facilities are provided by the Channel Fuel Co. at the Manchester wharf about two miles below the turning basin.

Fresh water from artesian wells is provided to ships entering the port and as the channel is fed by Buffalo bayou and the San Jacinto river, as well as other smaller tributary streams, the upper half of the waterway is in fresh water, which enables vessels to rid themselves of barnacles and other marine growth after a few days in port.

Houston's port is now equipped with the most modern fire boat in the United States, placed in commission last June. This vessel, the PORT HOUSTON, is a diesel electric plant 125 feet 10 inches in length, 27 feet in beam and of 8 feet 6 inches draft, fitted with two 500 horsepower Winton diesel engines driving two large Westinghouse generators, with an auxiliary

HANDLING SUGAR FROM SHIP TO WAREHOUSE OVER PORTABLE AND FIXED CONVEYORS



VESSEL LOADING WHEAT AT HOUSTON'S NEW PUBLIC MILLION BUSHEL GRAIN ELEVATOR

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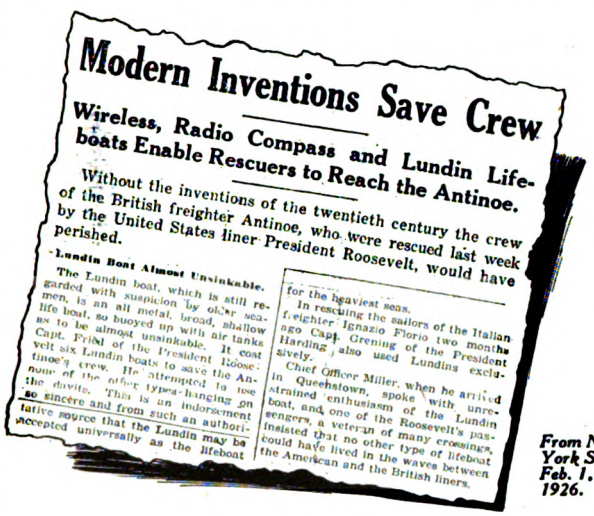
Lundin Life Boats
Saved Crew of Antinoe



Modern Inventions Save Crew

Wireless, Radio Compass and Lundin Lifeboats Enable Rescuers to Reach the Antinoe.

Without the inventions of the twentieth century the crew of the British freighter Antinoe, who were rescued last week by the United States liner President Roosevelt, would have perished.

Lundin Boat Almost Unsinkable.

The Lundin boat, which is still regarded with suspicion by older seamen, is an all metal, broad, shallow life boat, so buoyed up with air tanks as to be almost unsinkable. It cost Capt. Fried of the President Roosevelt six Lundin boats to save the Antinoe's crew. He attempted to use none of the other types hanging on the davits. This is an indorsement so sincere and from such an authoritative source that the Lundin may be accepted universally as the lifeboat for the heaviest seas.

In rescuing the sailors of the Italian freighter Ignazio Florio three months ago Capt. Grening of the President Harding also used Lundins exclusively.

Chief Officer Miller, when he arrived in Queenstown, spoke with unrestrained enthusiasm of the Lundin boat, and one of the Roosevelt's passengers, a veteran of many crossings, insisted that no other type of lifeboat could have lived in the waves between the American and the British liners.

From New York Sun. Feb. 1, 1926.

"THE Lundin boat is an all metal, broad, shallow lifeboat, so buoyed up with air tanks as to be almost unsinkable. Capt. Fried of the President Roosevelt attempted to use none of the other lifeboats hanging on the davits and without the LUNDIN LIFEBOATS, an innovation of the last decade, Capt. Fried might have been forced to stand powerless on the bridge and watch the freighter go down with all hands.

This is a sincere and authoritative endorsement that the "Lundin" may be accepted universally as the lifeboat for the heaviest seas.

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Welin Davit & Boat Corp.

305 Vernon Ave., Long Island City, N. Y.

Diesel Tug, Wm. A. Lydon, 108' Length, 25' Beam, 14' 3" Depth.

Built Right

The correct designing and building of Marine Equipment is your insurance of long and efficient service.

From the largest freighter, passenger or carferry to the smaller tug, barge or scow we are equipped to render efficient service.

Our staff of experienced engineers and skilled workmen, with a record of over twenty-five years of successful building, is your best insurance.

Designers and builders of steam or diesel propelled Craft, Marine Engines, Boilers, Steering engines, mooring windlasses, winches, Gypsies, life boats and other ship auxiliaries.

Modern dry docks and shop facilities make Manitowoc an ideal place for repairing and rebuilding marine equipment.

Let us figure on your future requirements.

Manitowoc Shipbuilding Corporation

Manitowoc Wisconsin

MANITOWOC

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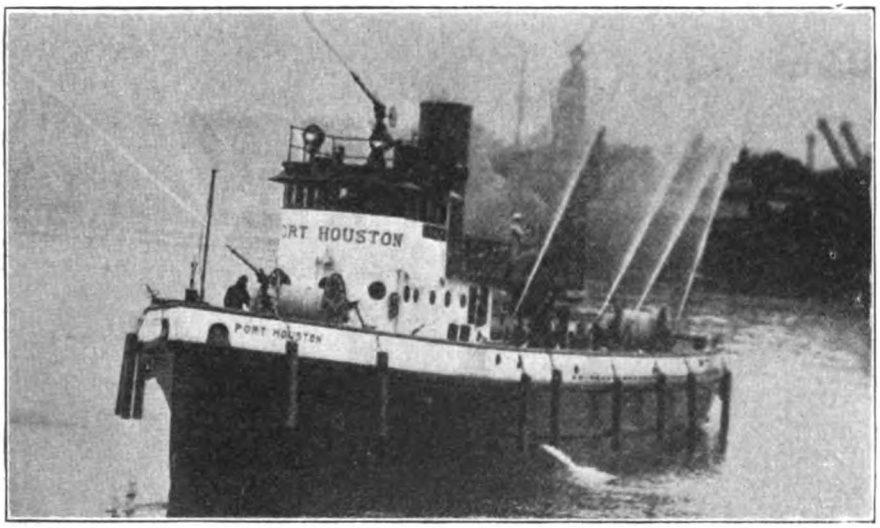


THE NEW DIESEL-ELECTRIC FIRE BOAT PORT HOUSTON IN PRACTICE DRILL

185 horsepower Winton diesel engine and generator direct connected. Motors drive the Worthington centrifugal pumps which have a capacity of 7500 gallons per minute at 150 pounds pressure through 39 nozzles.

A hinged water tower enables the fire boat to direct a stream upon decks of vessels or to roofs of wharves. Four other turrets and eight deck rail nozzles, as well as numerous hose connections provide for efficient water service from deck or ashore. A 10-inch hose connection from fire boat to shore mains enables the vessel to pump into shore system in case of accident to city or fire pump connections. The vessel has twin screws and is propelled by separate motors, all with Ward-Leonard controls in pilot house. A speed of 14 miles per hour can be maintained.

This fire boat was built by the Bethlehem Shipbuilding Corp., at the Harlan yard, Wilmington, Del., from designs by Cox & Stevens, naval architects, New York. A full description of the vessel was given in the MARINE REVIEW for April, 1926.

A light draft section of the main channel extends from the turning basin to the foot of Main street in the center of the city, a distance of about six miles, which provides a draft of 8 feet for barge traffic to the industries located along the upper channel and for the handling of building materials, etc., for industrial use.

Port handling charges are practically the same as those in effect at other Gulf ports, and are considered very reasonable, while the charges against the ships are at present only for dockage hire while vessel is idle at wharf.

Ample power for industrial purposes is provided by the Houston Lighting & Power Co., with its large electric plant on the main channel, generating over 65,000 kilowatts, while natural gas and fuel oil are available in any quantities desired, and the lignite coal fields of East Texas are only 100 miles distant.

The channel from Galveston bay to Houston affords a splendid location for industrial development, of which only about 20 per cent, developed during the past six to ten years, is now in use.

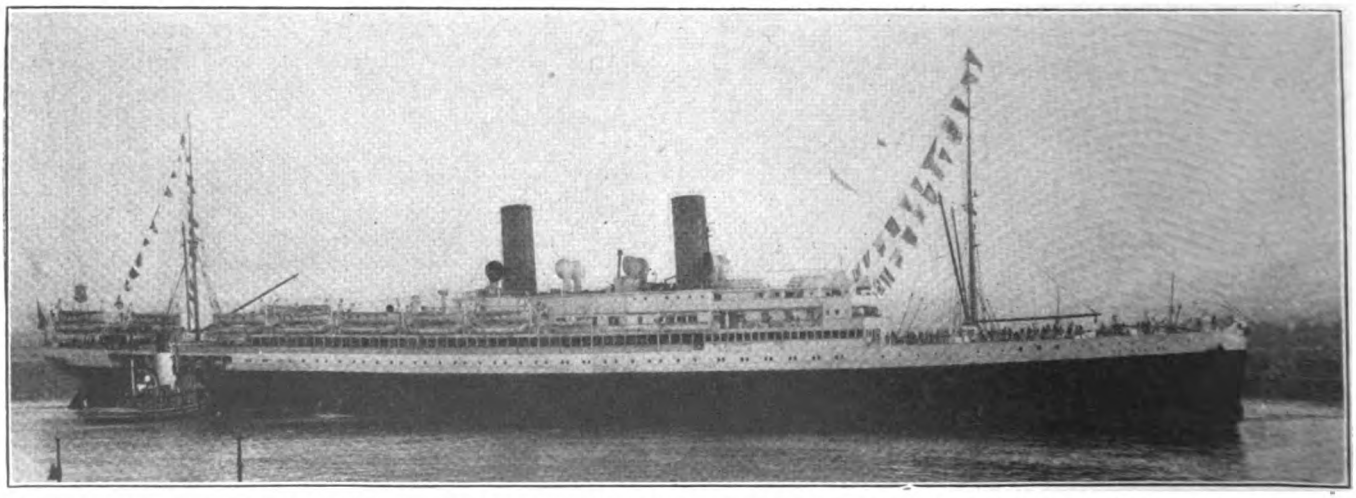
Through the use of ships and piers in the low lying sections of the channel and quay type wharves where the banks are high, it is estimated that berthing space at this port can be provided for over 2000 vessels.

The affairs of the port are administered by a nonpolitical body of five commissioners, two of whom are appointed by the county judge and county commissioners, two by the mayor and city council, and the chairman of the board by both bodies sitting in joint session, and these commissioners serve without pay, being selected from the most prominent business men of the city.

Under this body of commissioners the director of the port is the executive officer with the usual corps of assistants, engineers and wharf superintendents.

The commissioners meet one or more times each week to outline policies and procedure and to approve accounts, contracts, and other transactions. It is the policy of the board to encourage industrial development and the construction of private terminals as much as possible, the public providing only sufficient facilities to prevent a monopoly and to fix moderate charges.

A port located as is Houston, near the center of the greatest producing section of the United States, with its railroad systems radiating into the heart of the cotton and wheat belt and reaching out into the vast agricultural, stock raising and mineral producing sections of the Southwest, with pipe lines reaching the immense oil fields of Texas, Louisiana, Oklahoma and Kansas, with a fine climate has good future prospects.



FRENCH LINE PASSENGER STEAMER LAFAYETTE TURNING IN HOUSTON HARBOR AFTER A SPECIAL CRUISE TO WEST INDIES AND PANAMA

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Thorkote Has Won

Facts Are The Best Proof of Quality

In the "Leviathan"—the world's largest steamship—THORKOTE was used. As further evidence read this remarkable letter:

UNITED STATES LINES
45 Broadway
New York

March 2, 1926.

Thorkote Products Co., Inc.,
135 Liberty Street, New York, N. Y.
Gentlemen:

When the S.S. "LEVIATHAN" drydocked at Boston in February 1925, the space within the stern tubes that extend between the outer and inner bearings, were cleaned and painted with two coats of THORKOTE paint. Upon arrival of that vessel at the drydock in Boston during February of this year, three of these tailshafts were withdrawn and the condition of the THORKOTE was found to be as good as when applied. This I consider a most remarkable performance. We had tried many different materials for coating this section of the vessel without success.

The propeller shafts average 180 revolutions at sea, and this causes a violent circulation of the water in this locality, usually working the sea water into quite a foam. This we have proven by drawing off water in this location when vessel was at sea, and proves the performance of the THORKOTE to be most satisfactory.

The Chief Engineer of the S.S. "LEVIATHAN" has painted the water boxes of the main condensers with THORKOTE and it has also given satisfactory results in that place.

I believe that you will like to hear the results of your material, especially as it is given without having been asked for, and no motive is attached to giving information other than to assist other superintendents who are troubled with corrosion.—Yours very truly,

W. L. BUNKER,
Superintendent Engineer.

WLB-LJ

THORKOTE

FOR years Steamship Owners and Operators, Engineers and Naval Architects have sought a waterproof covering for Magnesia and other heat insulating materials, which could be easily applied and repaired and which would not be eaten away by rust.

This has finally been found and we offer to those seeking the maximum of efficiency—THORKOTE.

THORKOTE is a plastic material easily applied over insulating materials. It becomes hard shortly after application making an ideal covering for Boilers, Tanks, Feed Water and Oil Heaters. Brine Tanks, and Coolers, Deck Lines, Thermo Coil Heater Housings, etc., etc.

CUT your port fuel charges by insulating your deck steam lines and protect this insulation with THORKOTE.

Deck steam lines in the past have as a general rule been left uninsulated because there was no practical protection for the insulation.

You can now insulate your deck lines, cover with THORKOTE and take advantage of the fuel savings to be derived.

THORKOTE CEMENTS FOR

Tank Tops—Bilges	Tail Shafts—Rudders
Fore-After Peak Tanks	Smoke Stacks
Domestic—F-W Tanks	Canvas Decks
Coal Bunkers—Holds	Standing Rigging

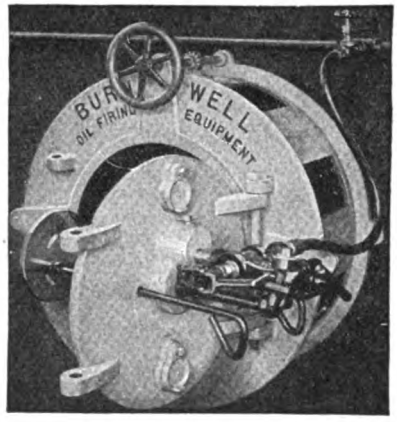
Each branch of insulation especially studied and treated with regard to conditions and requirements.

A LIST OF SATISFIED CUSTOMERS WILL BE FURNISHED ON REQUEST

Thorkote Products Company, Inc. 135 Liberty St., New York

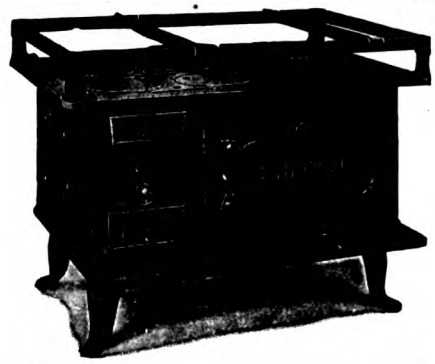
OIL BURNING BURNWELL SYSTEM

ASK US—*Why*



FUEL OIL
is
BEST BURNED
By
Use of
BURNWELL EQUIPMENT

John S.
PATTEN ENGINEERING CO.
INCORPORATED
Marine and Combustion Engineers
TEN HANOVER ST. — NEW YORK CITY



If the numerous pleasant and gratifying things that SHIPMATE owners write us could be published without being taken for ordinary testimonials, we should like very much to print them, as they are very persuasive.

Such expressions as the following frequently occur in our correspondence:

"The SHIPMATE still occupies a very warm place in my affections and its circle of friends is constantly increasing."

From the Isle of Wight, England,

"About nine years ago I bought a SHIPMATE; it has been a great comfort, and absolutely successful; I want another."

THE STAMFORD FOUNDRY CO.
Established 1830 STAMFORD, CONN.

Please mention MARINE REVIEW *when writing to Advertisers*

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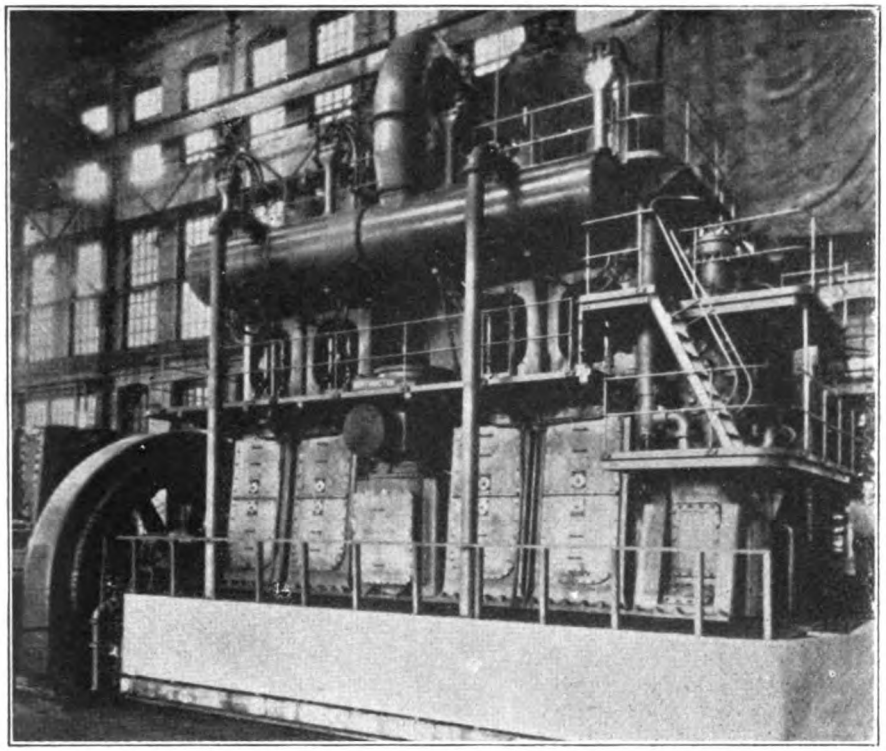


THE 2900-BRAKE HORSEPOWER, 4-CYLINDER, DOUBLE-ACTING WORTHINGTON DIESEL ENGINE IN THE SHOP BEFORE IT WAS SHIPPED TO NEWPORT NEWS FOR INSTALLATION IN THE M. S. TAMPA

M S. Tampa Sea Trials

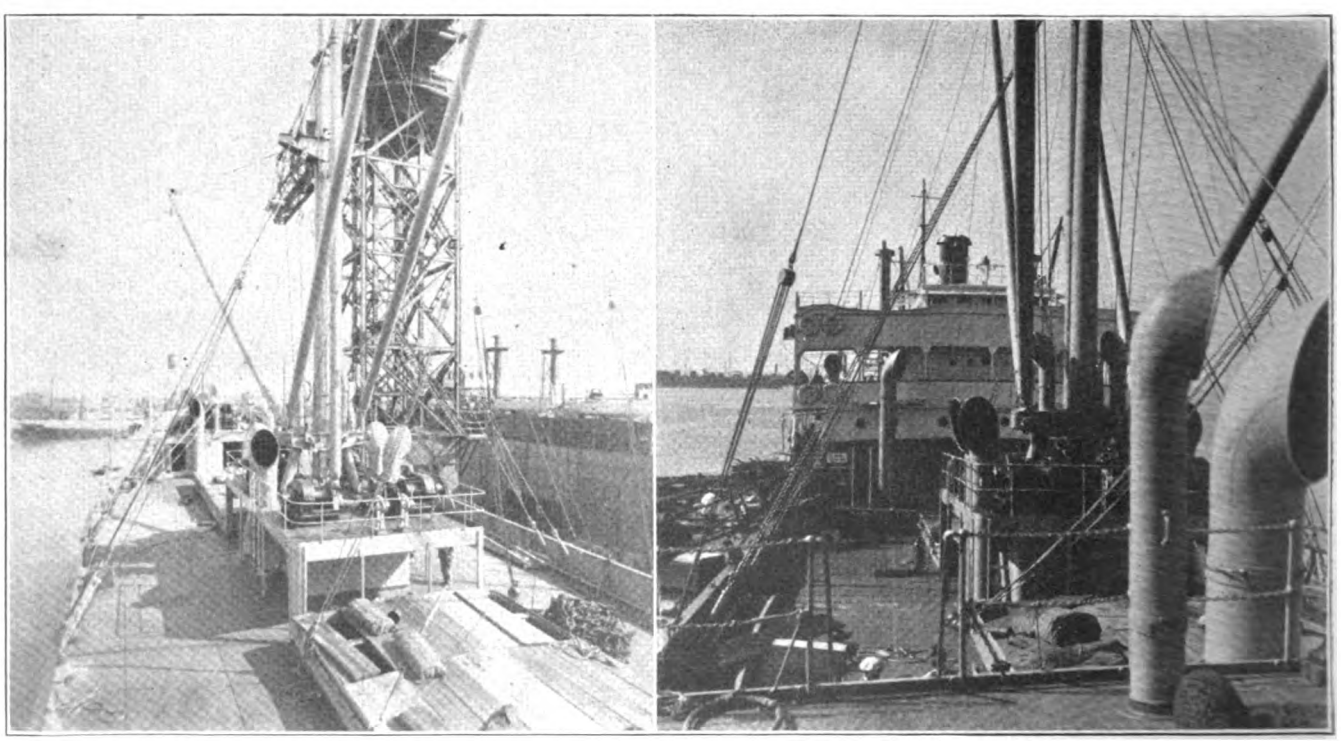
(*Continued from Page* 28)

for "Wheel" and "Gyro" steering. During the trial all three methods were tried out repeatedly.

It is apparent from an inspection of the TAMPA that no effort has been spared to make her a most efficient cargo vessel. There are four large cargo hatches, two in the forward and two in the after well and one smaller hatch through the bridge deck. The original masts booms and king posts were retained. All of the winches were removed and new electric winches of a special design, in which the staff of the technical section of the fleet corporation collaborated with engineers of the Lidgerwood Mfg. Co., were installed. These winches with all previous experience to draw upon are undoubtedly of the highest quality. They are driven by 25-horsepower Westinghouse motors through cut steel gearing enclosed in an oil tight case providing constant splash oil lubrication. A load of 1500 pounds can be handled at a speed of 275 feet per minute. These winches are illustrated and described in detail on page 88 of the November 1926 number of MARINE REVIEW.

Fine Winch Installation

Equal care and thought was given to the proper installation of these winches. A substantial raised steel platform with a completely enclosed steel house underneath (making a watertight deck house) was erected around each mast between the two hatches on the forward and after well decks. These platforms are about ten feet above the deck and support the four winches serving each set of two hatches. There are a number of distinct advantages in this arrangement. The operator gets an unobstructed view of the hatch and of the dock or lighter; the operator and winches are better protected; a deck load can be carried without any interference with the efficient operation of the winches; and all of the electrical controls are removed from the vicinity of the winch and are completely protected from possible



AT LEFT—LOOKING FORWARD FROM THE BRIDGE WINCH—PLATFORM BETWEEN HATCHES NO. 1 AND 2 WITH TWO ELECTRIC WINCHES SERVING EACH HATCH—ALL ELECTRICAL CONTROLS LOCATED IN STEEL HOUSE UNDER PLATFORM—AT RIGHT—ANOTHER VIEW OF THE SAME WINCH PLATFORM LOOKING AFT FROM FORE CASTLE DECK

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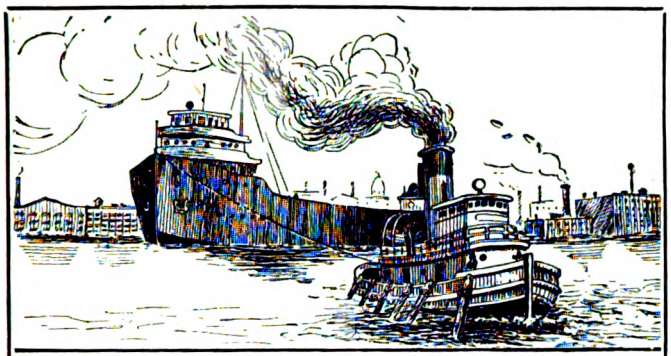


YOU LEAVE PORT

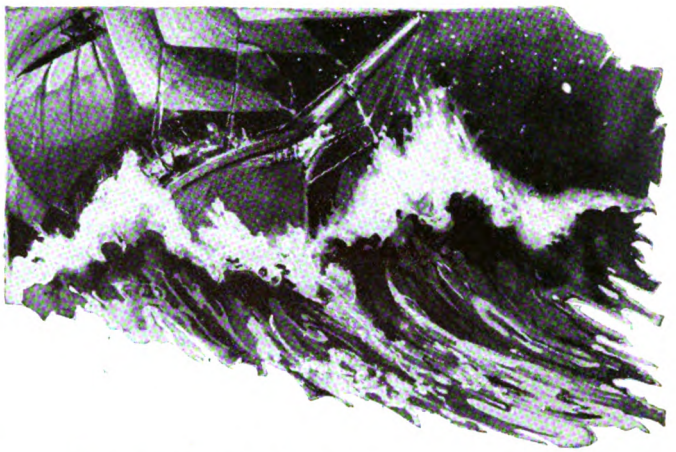
With a feeling of satisfaction when the vessel is furnished with Supplies that you can depend on.

That is the kind we have been delivering to the boats on the great lakes for over 80 years.

Our General Catalog No. 111 should be in the hands of every vessel owner or operator.

Forwarded on application.

GEO·B·CARPENTER & CO.
MARINE SUPPLIES
436 No. Wells St. Chicago



Who hath desired the sea?—
the immense and contemptuous surges?
The shudder, the stumble, the swerve,
as the star-splitting bowsprit emerges?
Rudyard Kipling.

DOWN plunges her nose, buried in stormy seas. Waves pound her sides, and break swirling over decks. Lee scuppers under. Yet on she goes, riding the waves without fear, deck and side seams right-caulked with

STRATFORD OAKUM

Sailormen like Stratford Oakum—they know it and use it. And so did their granddads, nearly a hundred years ago. They knew, as you will know, that there is only one oakum to use, and it is Stratford.

Do not accept a substitute, there is none "just as good."

GEORGE STRATFORD OAKUM CO.

Jersey City,
New Jersey
Also manufacturers of Cotton Wiping Waste

*

Courtesy "Motorship"

Port of Portland's Diesel-electric Dredge "Clackamas."

FRICK

Refrigeration on the World's Largest Dredge

The 50 officers and men of the "Clackamas" have the benefits of cold drinking water, pure ice, and a cold storage room for food, through a Frick Combined Refrigerating Machine. What has your ship?

Bulletins on request.

Frick Company
WAYNESBORO, PA., U.S.A.
ICE MACHINERY SUPERIOR SINCE 1882

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damage by cargo or exposure to the sea and weather, beneath the platform in the steel enclosed structure below. This will appeal to every practical steamship operator and it is a progressive step in the improvement of cargo handling facilities. The TAMPA has ten winches in all, two for each hatch including the bridge deck hatch where the two winches are secured to foundations on the deck, each winch serving a single boom on separate king posts. The booms are of wood of 5-ton capacity except on the bridge where they are of 3-ton capacity. There is also a heavy lift steel boom of 30-ton capacity stepped independently on the raised platform just aft of the foremast.

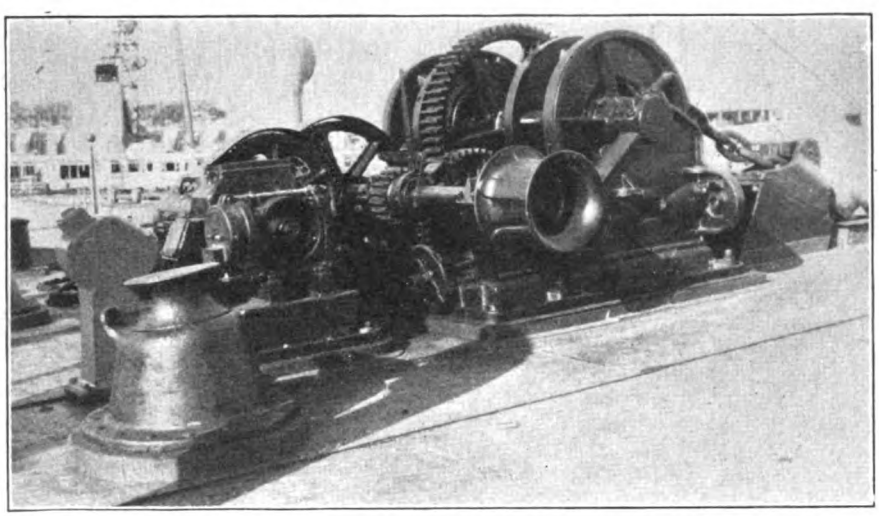
Rooms for Eleven Passengers

Accommodations for the crew and officers are new throughout and have been laid out with a view to maximum comfort and sanitation. In line with modern practice abroad quarters have been arranged for eleven passengers in well ventilated rooms having metal beds electric fans and running fresh water to basins. Hot and cold fresh water is provided to baths. The entire vessel was thoroughly reconditioned. The hull was drydocked scaled, chipped and painted. All running gear was freed and put in good working order.

The following officers regularly commissioned operated the M. S. TAMPA during her sea trials: P. P. Taylor, captain; L. H. Hirschy, chief engineer; Harry Underwood, steward; Walter Holbaum, first officer; W. C. Dowe, first assistant engineer; W. S. Carroll, second officer; C. H. Coburn, second assistant engineer; W. I. Cox, third officer; A. F. Jones, third assistant engineer; W. J. Christiansen, fourth assistant engineer.

In the accompanying Table 3 the costs of converting this vessel is itemized. The total of $740,021 and at first glance this seems high. For a private operator on the basis of these costs it would work out as follows: The original steamship, if agreed to convert to diesel drive, could be purchased from the shipping board for between $5 and $7 a deadweight ton. At the larger figure this would be about $67,000. Adding this to $740,021 the total cost for a complete modern economical cargo vessel of 9120 deadweight capacity would be $807,021 or about $88.50 per deadweight ton. Now that both the engine builder and the shipyard have had the experience, and with savings a private owner might be able to make, it is possible that the conversion figure might be cut by $100,000. Further, assuming that the hull could be bought for conversion at $5.00 a ton, the total cost for the converted vessel would be $688,000 or $75.40 per deadweight ton.

No data on fuel consumption during the trial trip is available but the results from the thirty days' shop trial gave a consumption of 15 tons per day developing the full rated horsepower. The steamship consumption was at least 35 tons per day at sea. During the shop test the engine ran on ordinary navy bunker oil such as is ordinarily burned under boilers. If the oil regularly used can be of the same grade as boiler oil the savings in fuel per day at sea, over that for a steamship of the same size, for present prices of fuel oil at New York would be about $240 per day. Differentiating between suitable high grade diesel oil and ordinary bunker oil using the one for the motor vessel and the other for the steamship the saving would be $170 per day.



WINDLASS M. S. TAMPA—ORIGINAL STEAM WINDLASS OF AMERICAN ENGINEERING CO. MAKE, REBUILT FOR ELECTRIC MOTOR DRIVE—45-HORSEPOWER WESTINGHOUSE MOTOR—CUTLER-HAMMER SHOE BRAKE

Bids Received For Sale of U. S. Lines

On Nov. 8, the shipping board received bids for the United States lines and the American Merchant lines.

P. A. S. Franklin in behalf of the Atlantic Transport Co. offered to buy the LEVIATHAN for $4,000,000 guaranteeing operation for ten years under the American flag. with the provisio that she would receive as much mail as she does at present.

J. H. Winchester & Co., operators of the American Merchant lines offered to buy the five ships that they are operating for $200,000 each, or a total of $1,000,000 for the service. An offer was also made to charter the United States lines at the rate of $5000 a month plus 50 per cent of the net operating profits, and to construct for operation on this line two new mail passenger express ships at a cost aggregating $30,000,000. The bidder proposed to secure $20,000,000 of the cost of these new vessels from the shipping board construction loan fund.

Kermit Roosevelt, president of the Roosevelt Steamship Co. submitted an offer of $252,000 per ship or $1,210,000 for the American Merchant line. His bid further offered to operate the United States lines for the shipping board, by forming a new corporation of American shipping men including the firm of Moore and McCormack.

An offer by the Potter Steamship Co. Inc., New York to buy either the PRESIDENT HARDING or the PRESIDENT ROOSEVELT for $1,505,000 was rejected as the board did not contemplate selling single vessels. The Barber Steamship Lines Inc. offered in the event that the ships were not disposed of on the basis of the bids received, to submit an alternative proposal.

On Nov. 16, the shipping board voted to give representatives of J. H. Winchester & Co. and William F. Kenney and associates a hearing on their proposal for the purchase of the American Merchant lines and the charter of the United States lines. The hearings were to be held on Nov. 17, but up to the time this is written nothing further has been heard. The bidders at that time were to be given an opportunity to explain their proposal to the board.

The board at the same time voted not to accept or give further consideration to the proposal received from Kermit Roosevelt and associates.

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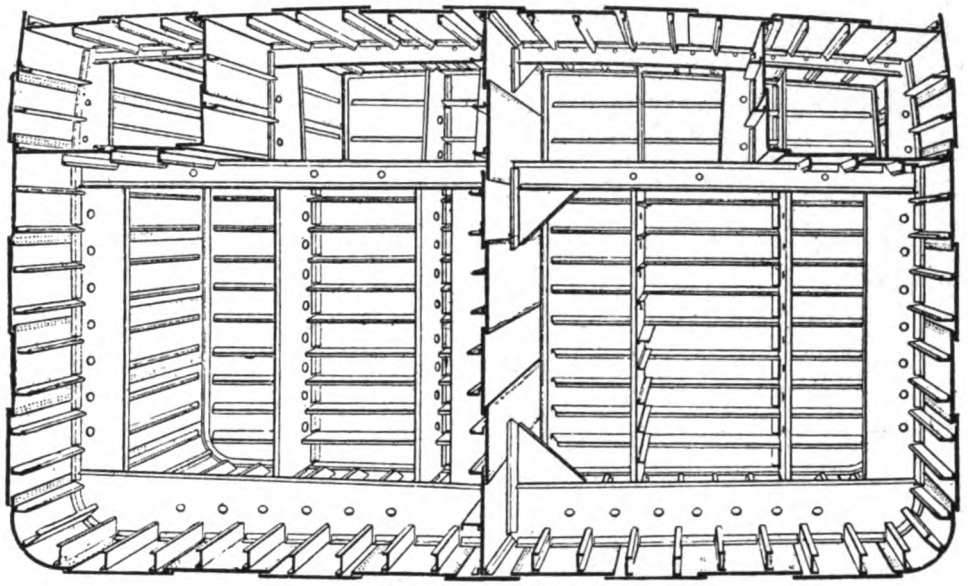

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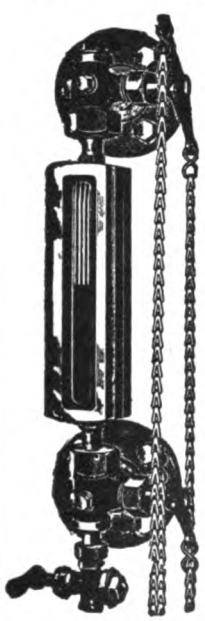

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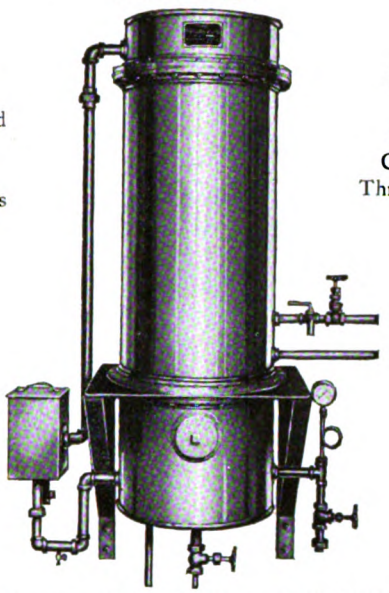

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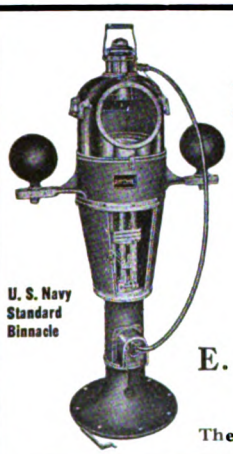

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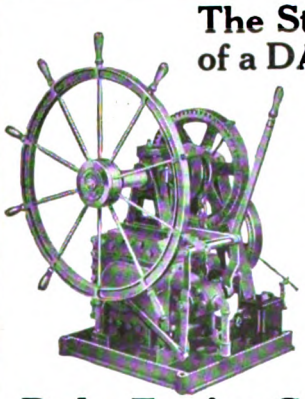

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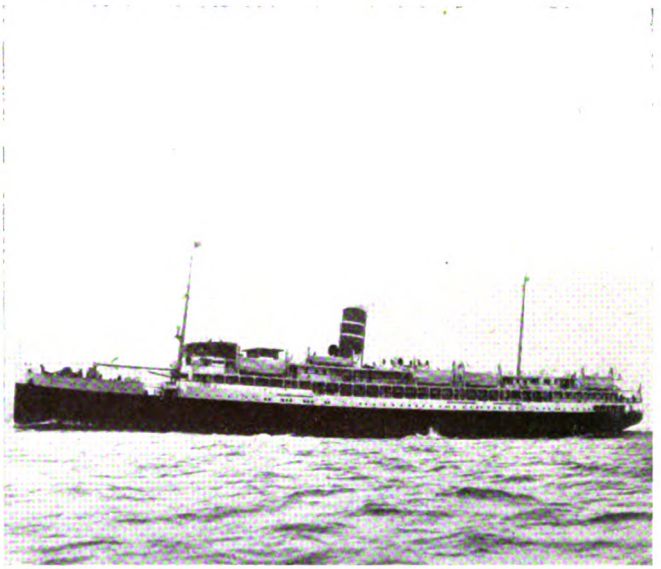

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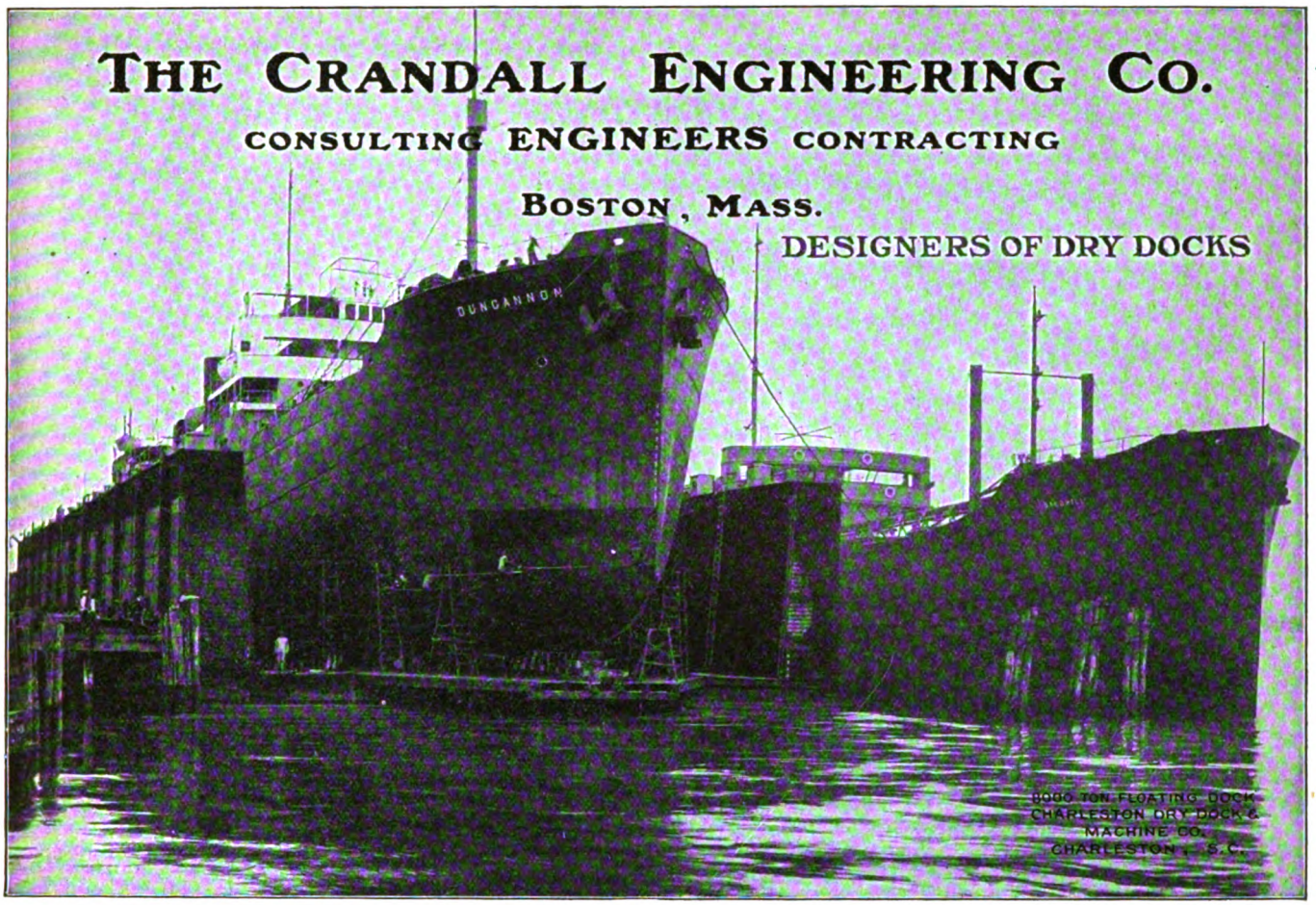

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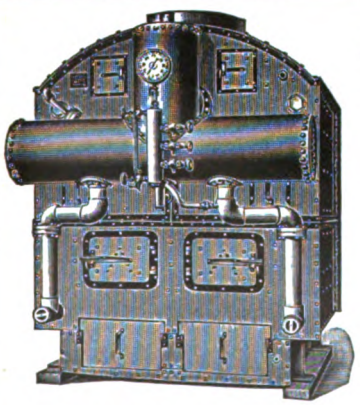

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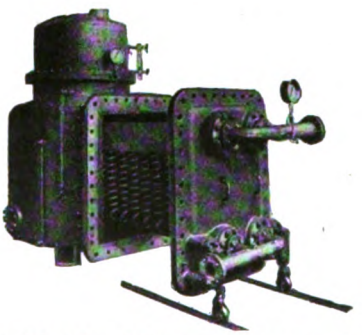

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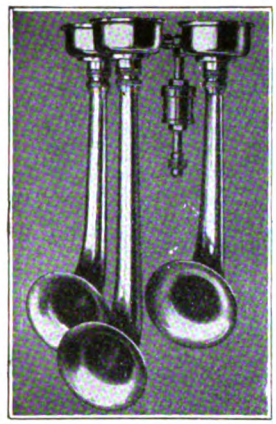

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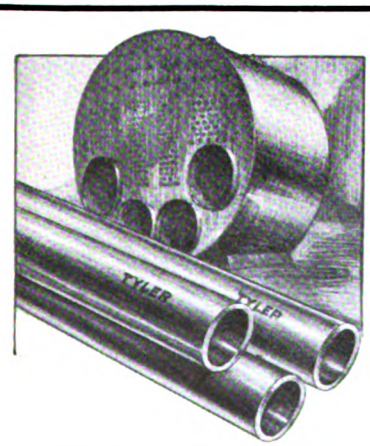

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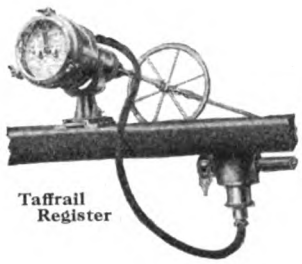

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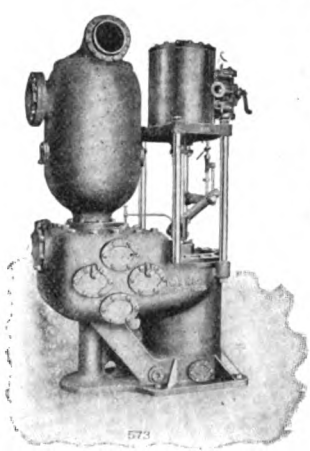

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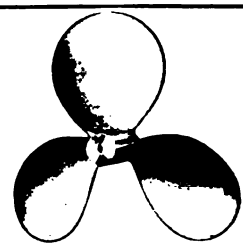

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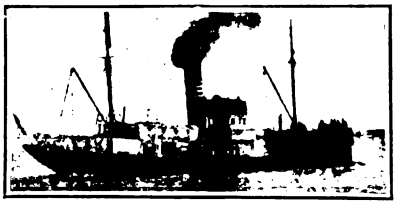

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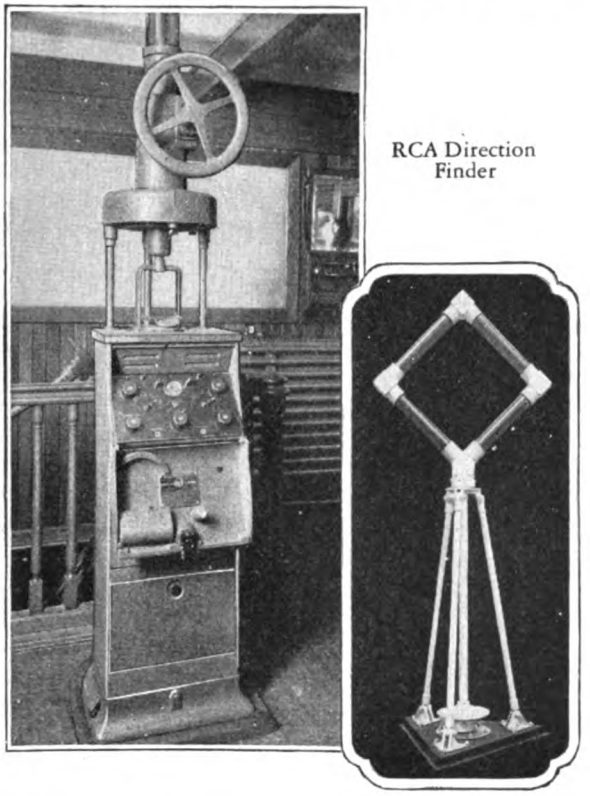

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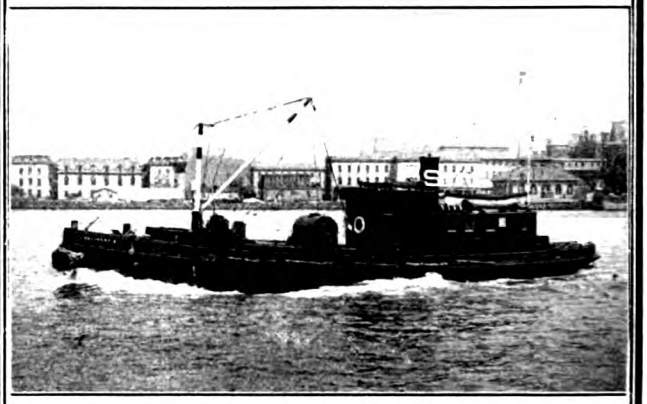

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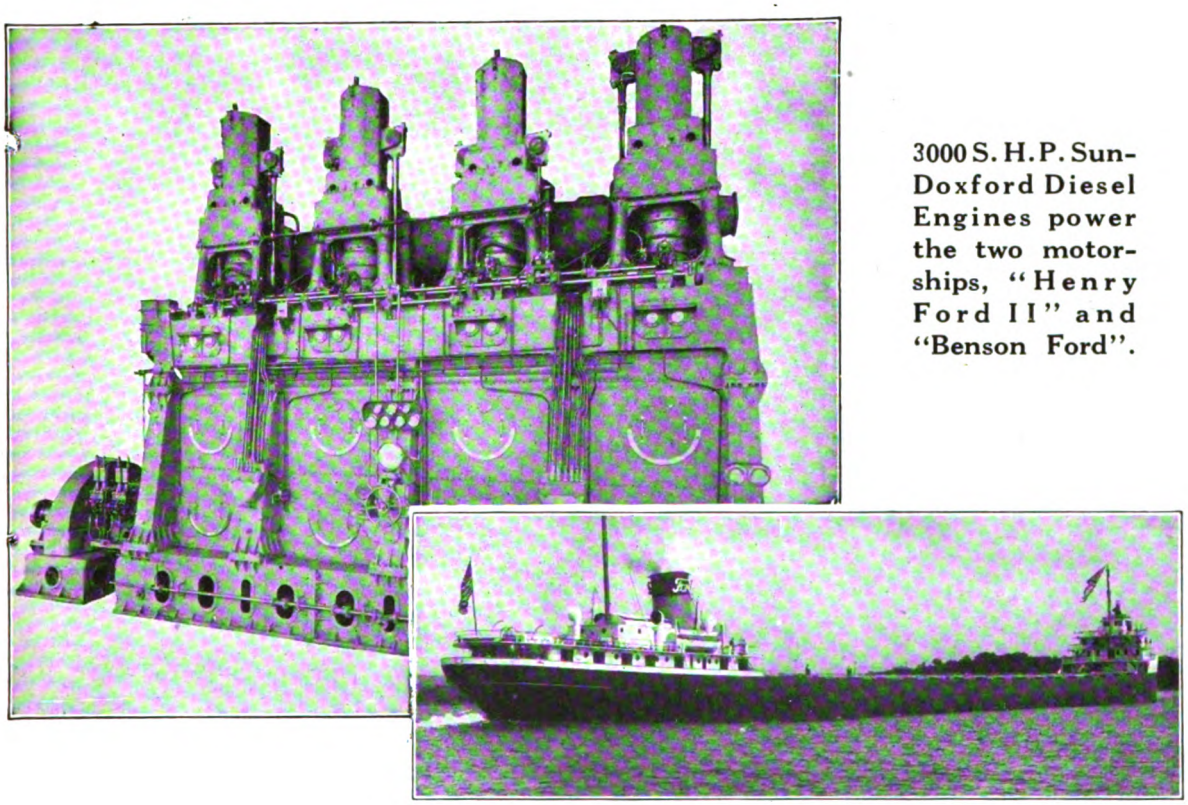

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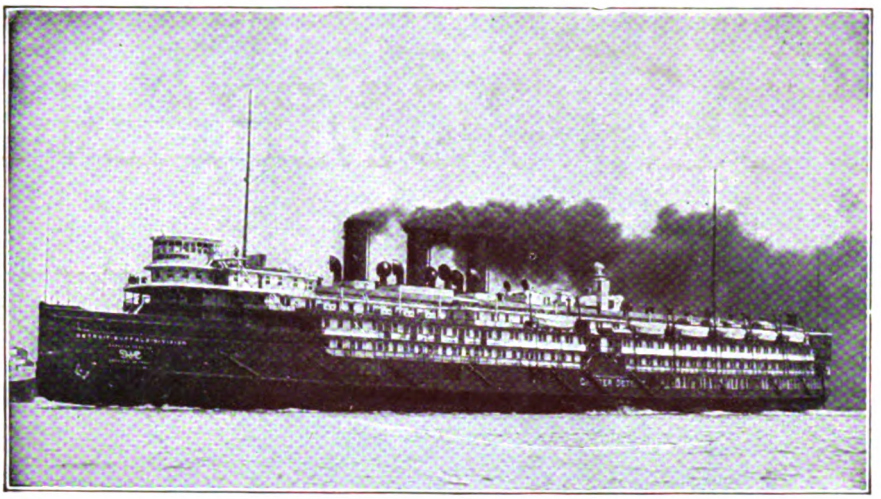

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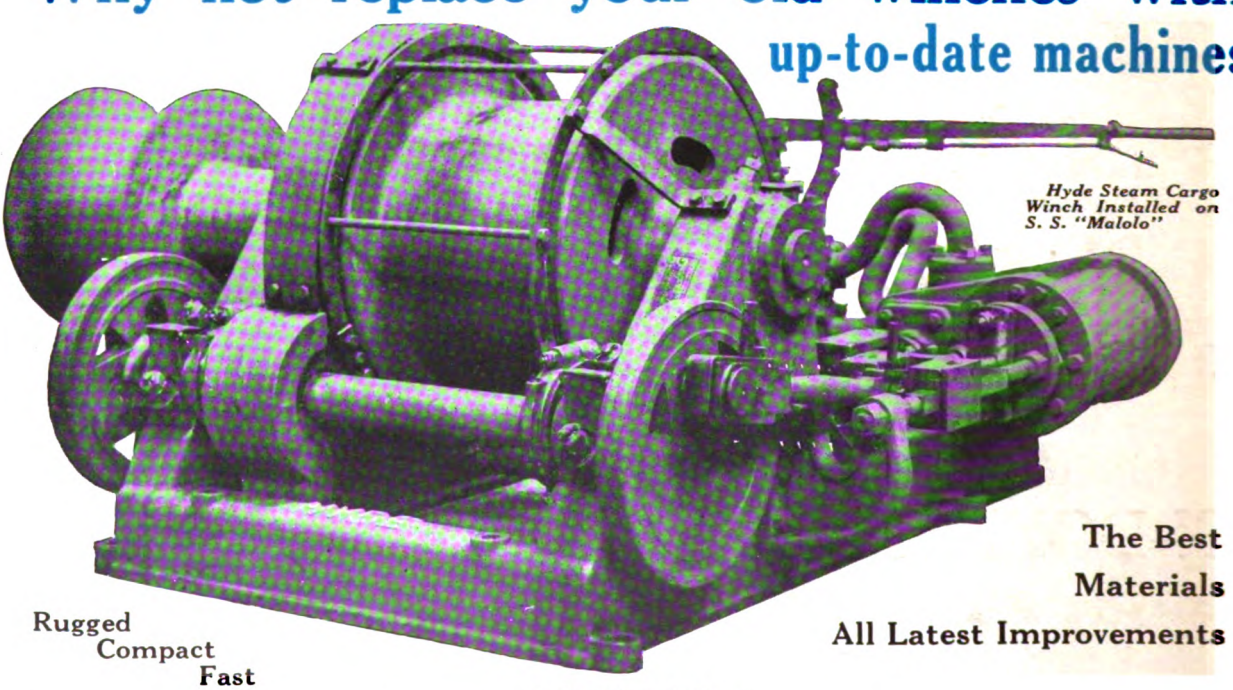

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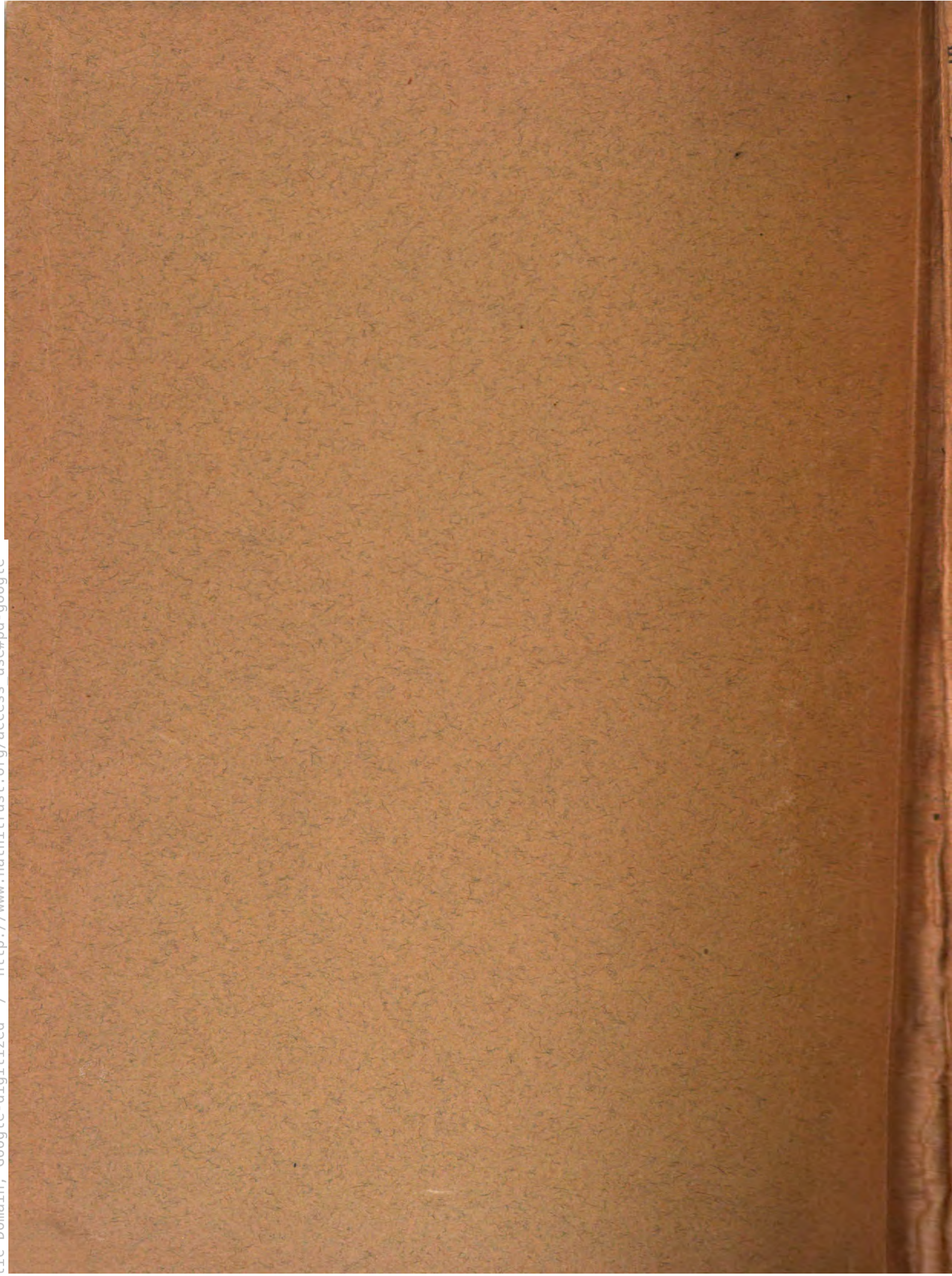

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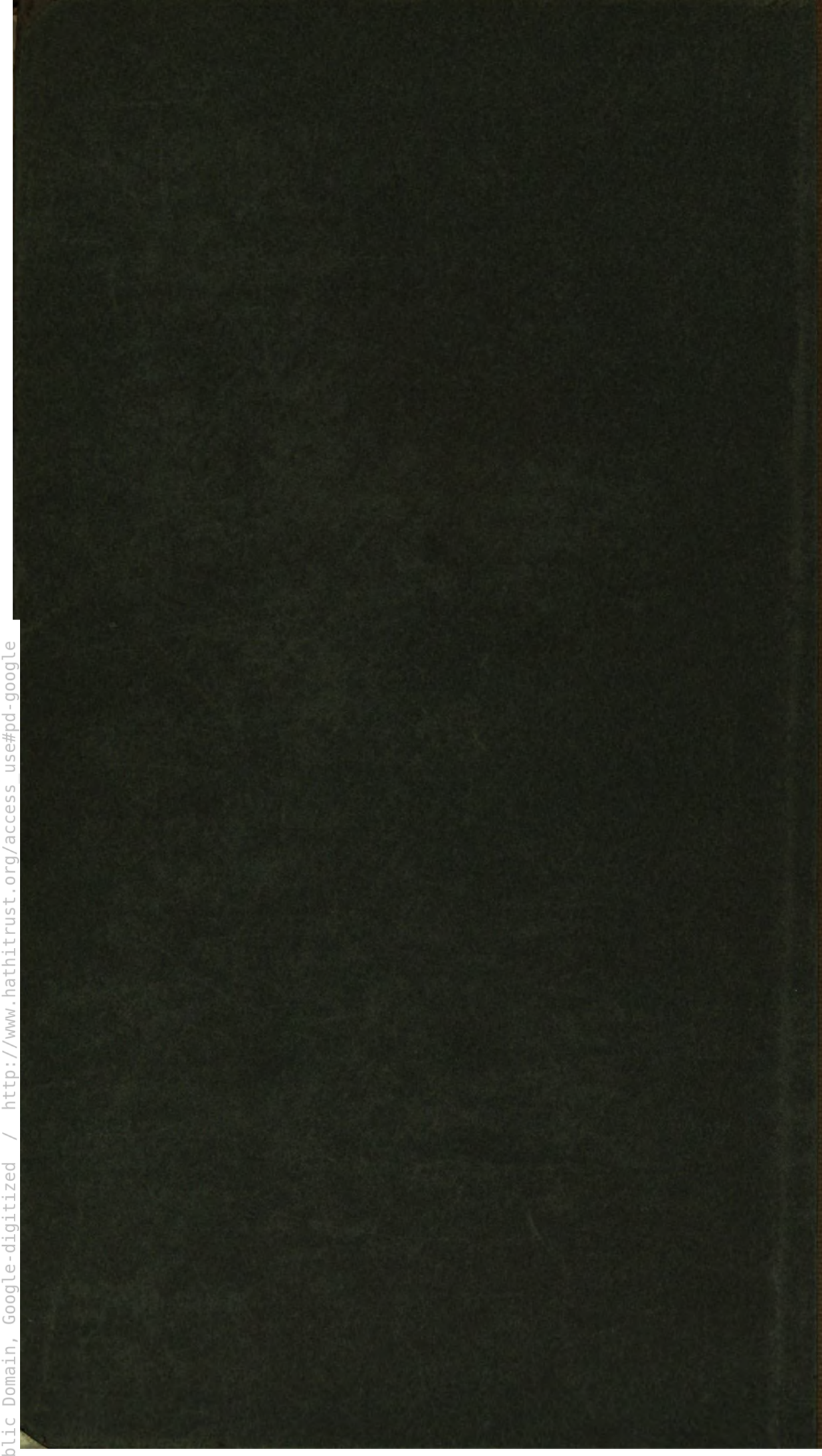

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